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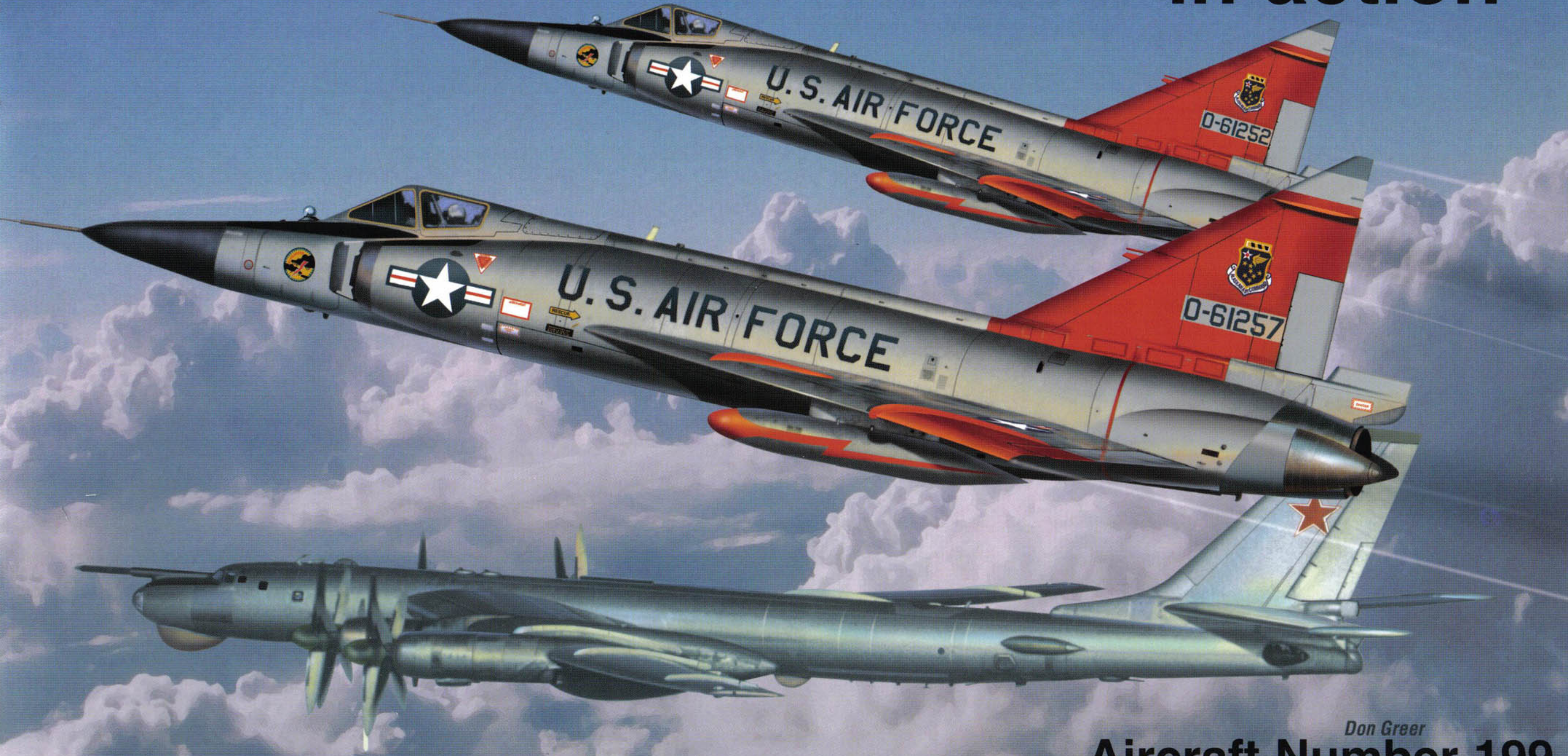
F-102A Delta Dagger

in action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Don Greer

Aircraft Number 199

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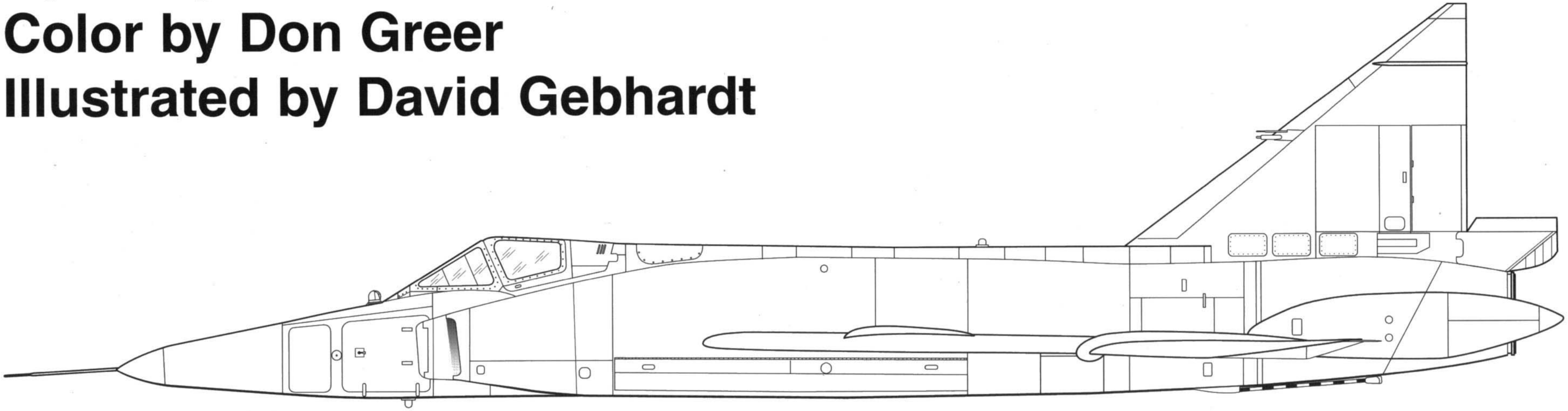
F-102A Delta Dagger

in action

By Larry Davis
Color by Don Greer
Illustrated by David Gebhardt



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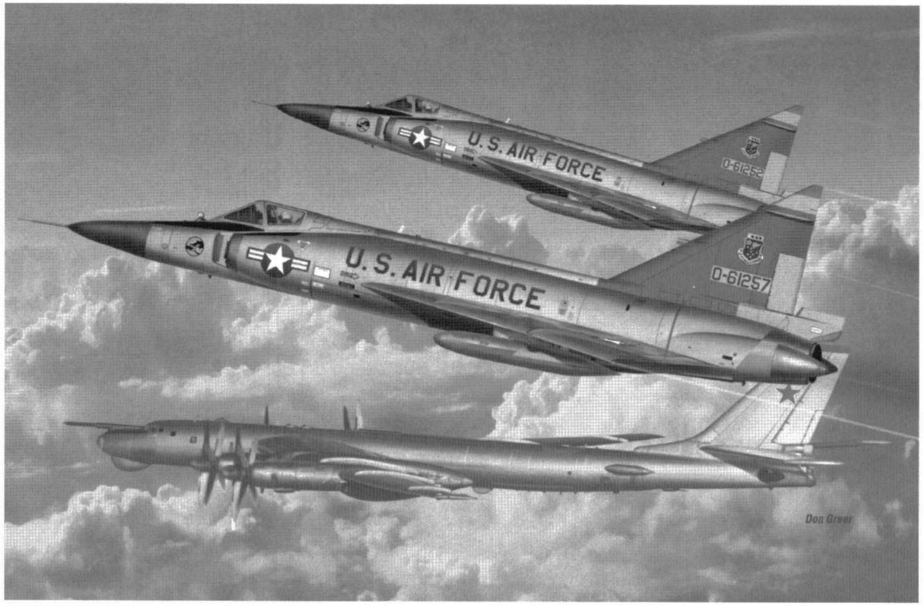

Cover: F-102A Delta Daggers from the 317th Fighter Interceptor Squadron based at Elmendorf AFB, Alaska, intercept a Soviet Tupolev TU-95 "Bear" bomber over the Bering Sea in 1969.

Dedication:

To all the Cold War warriors that stood guard against all threats, all over the world for over fifty years - and still do!

Acknowledgements

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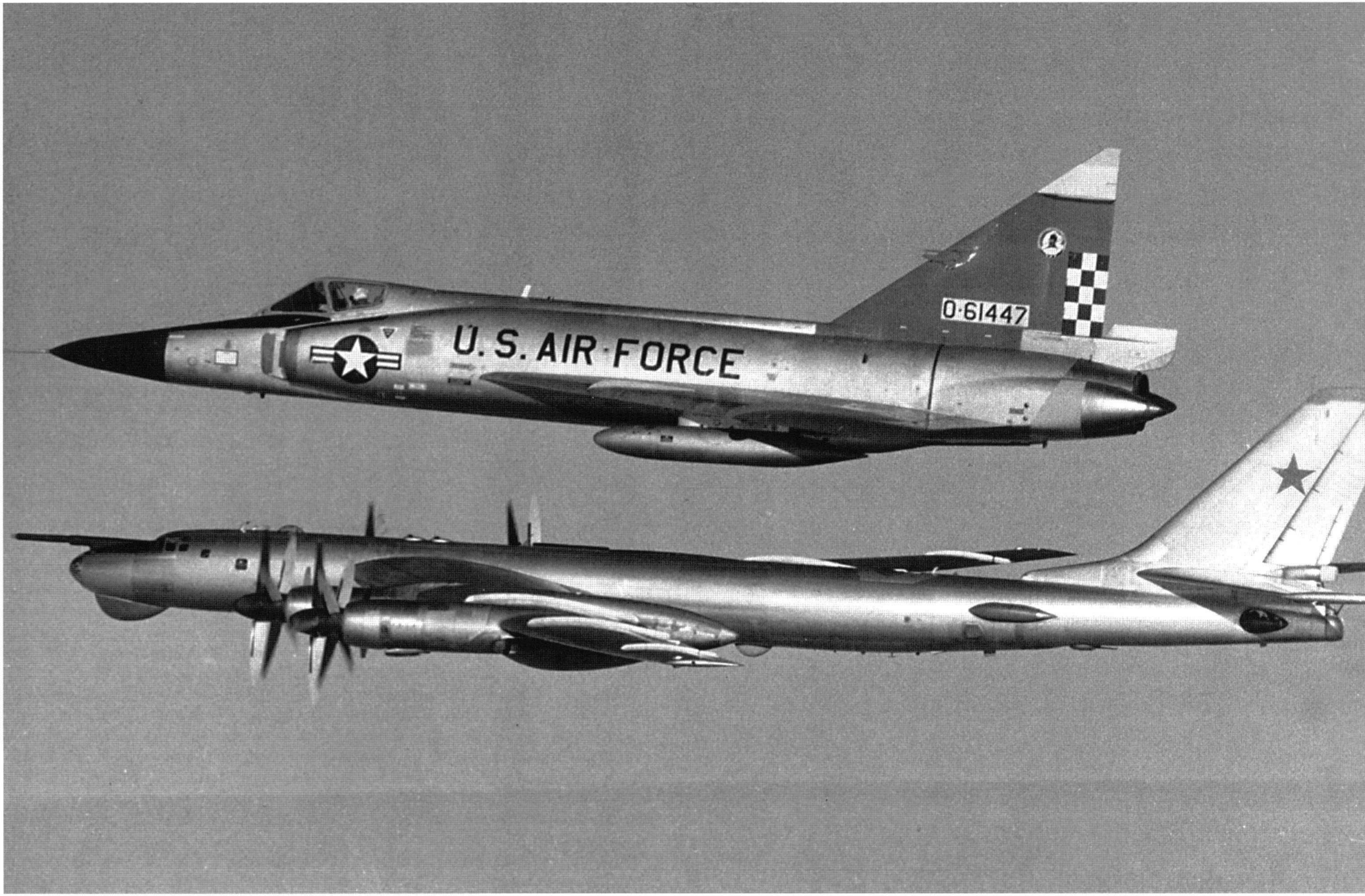


A silver-painted F-102A Delta Dagger from the 57th FIS at Keflavik, Iceland, intercepts a Soviet Air Force TU-95 "Bear" long range bomber. F-102s from the 57th FIS made over 1,000 intercepts of Soviet bombers during the 1960s. (USAF via Robert F. Dorr)

Introduction

The delta wing is not particularly new. As early as 1650, the Polish artillery specialist Kazimierz Siemienowicz described the construction of rockets having delta-shaped stabilizers instead of the usual guiding rods. In 1867 Englishmen James W. Butler and Edmund Edwards were awarded a patent for a delta-winged aircraft powered by a jet of steam. But practical delta-winged aircraft are a twentieth-century development, and German aerodynamicist Dr. Alexander Lippisch is considered to be the "father of delta wing aircraft designs." Dr. Lippisch had completed several tailless and delta wing glider designs as early as 1937 and successfully tested a 60-degree delta wing in a supersonic wind tunnel in 1939. By 1940, one of the Lippisch tailless designs had been combined with an experimental German rocket engine to create the DFS 194, which attained a speed of 341 miles per hour that same year.

NACA scientists in the United States had also shown an interest in the delta wing. Pre-World War II studies had indicated that such a wing would have a very low aspect ratio, resulting in some very high speeds. But it was just a theory, as no powerplant was then available to take advantage of the theory — at least in the United States.

Hitler's Air Ministry saw the potential of the new design and ordered Lippisch to design and build three prototypes of what would become the Messerschmitt Me 163, the first operational tailless aircraft in history. Even unpowered, the Me 163 prototype exceeded the world speed record, reaching 525 mph in an unpowered dive. With a new Walter rocket engine of 1,650 pounds thrust, Lippisch's new fighter reached speeds in excess of 625 mph, some 156 mph faster than the existing record.

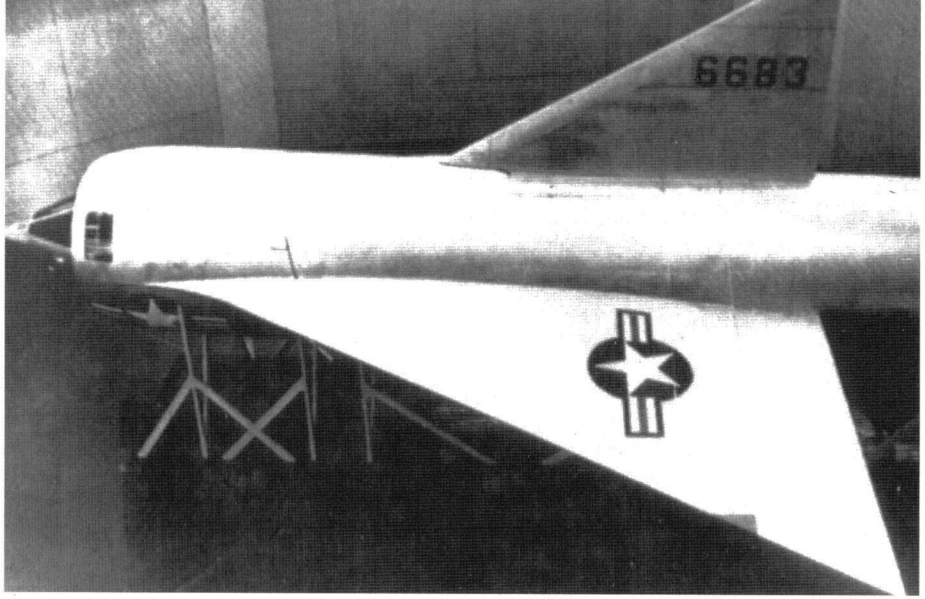
At the end of World War II both Lippisch and his extensive research papers fell into American hands. In particular, the design team at Convair's Downey, California, plant found the Lippisch papers to be quite interesting. Using data garnered from the Lippisch and NACA experiments, plus tests of captured Me 163 Komet aircraft, chief engineer Jack Irvine, his assistant Frank Davis, Convair design chief Adolph Burstein, and aerodynamicist Ralph Shick put together a design proposal and submitted it to the Army Air Forces.

That proposal led to a formal contract in 1946 for a very strange-looking airplane. It was known as Secret Project MX-813, but the AAF designated it "XP-92." The new design had a triangle-shaped wing and vertical tail surfaces and was to be powered by both a ramjet and a rocket motor, the pilot sitting inside the intake cone. However, after wind tunnel tests indicated major problems, the Convair team redesigned the entire aircraft, keeping the 60-degree triangular planform but using a conventional fuselage with a production jet engine.

Extensive wind tunnel tests totaling over 5000 hours indicated that the new "delta" wing, so called due to its similarity to the Greek letter Δ (delta), had a much lower drag coefficient than any other wing type, including swept wings. The tests also revealed that the drag coefficient decreased as the wing leading edge angle was increased. For instance, a 45-degree swept wing, like that used on the F-100 Super Sabre, had a drag coefficient of 0.072. But at 60 degrees, the drag coefficient dropped to an astonishing 0.048. The tests also indicated that the new 60-degree delta wing would be very stable at high altitude, but retain good low-speed handling characteristics. By November 1946, the original MX-813 project had been scrapped, and the AAF had issued a new contract to Convair to build a single XP-92A experimental aircraft to flight test the delta wing theories.

XP-92A (Model 7002)

The XP-92A, serial 46-682, was built during the spring and summer of 1947. One of the AAF requirements was a very short deadline for completion. As little money was available for all-new subassemblies, Convair had to use existing components and parts to complete the airplane. The nose gear came from a Bell P-63A, while the main landing gear came from a North American FJ-1 Fury. The ejection seat came from Convair's own XP-81. The powerplant would be the tried and true Allison J33-A-21 turbojet, the same engine used in the Lockheed YP-80A.



The original Convair XP-92 prototype was a delta-winged fighter with both a rocket engine and ramjet engine for power. The cockpit was in the intake nose cone. (AFFTC)

The fuselage was a slender cigar-shape with the cockpit in a conventional location atop the forward fuselage. The engine would get its air through a nose intake similar to that of the Republic XP-84. The delta wing was swept at 60 degrees, as was the vertical tail. No horizontal stabilizer was to be used; the function of elevators, which controlled pitch and were normally part of the horizontal stabilizer unit on the rear of a conventional aircraft, was merged with the ailerons on the trailing edge of the delta wing to create new control surfaces known as "elevons."

In the fall of 1947, the XP-92A was completed at Convair's San Diego plant, and wind tunnel tests of the new airframe immediately followed at the Ames Research Facility at Moffett Field near Oakland. The J33-A-21 engine was installed during March 1948, and the XP-92A was trucked to Muroc Army Air Field (later renamed Edwards AFB and the home of the Air Force Flight Test Center) in the California high desert north of Los Angeles, arriving 1 April 1948. Initial taxi trials began in late May, and it was during one of these on 9 June that the XP-92A, with Convair test pilot 'Sam' Shannon at the controls, became airborne for the first time, flying at an altitude of ten to fifteen feet over a distance of about two miles.

These tests continued over the next few weeks, the XP-92A, flown by Convair test pilots Shannon and William Martin, making short hops across the dry lake bed at Muroc. On 18 September 1948, with Shannon again at the controls, the XP-92A lifted off the Muroc runway for its first legitimate flight. It was the world's first powered delta wing aircraft to fly, and Shannon reported that the airplane was a stable flying platform, similar to a conventional aircraft. The new elevon flight controls worked smoothly and gave the airplane a high degree of maneuverability, but retained good low-speed characteristics that made it easy to land. Top speed approached 600

Although severely underpowered, the Convair XP-92A prototype was the world's first true delta wing aircraft, making its first flight 18 September 1948. (AFFTC)

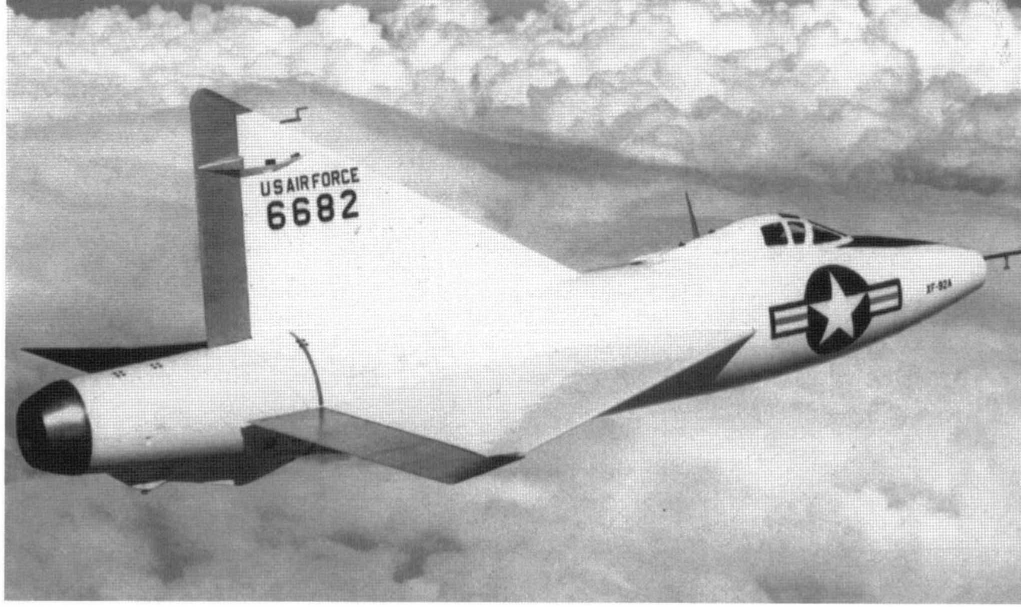
miles per hour, but a lack of thrust kept it from going anywhere near Mach 1.

What was needed was much more power. Following the initial flights, the decision was made to install an Allison J-33-A-23 engine of 5,200 pounds thrust in place of the original -21 engine, along with a new exhaust pipe and modified tail cone and cockpit canopy. The airplane returned to flight status on 19 February 1949 and was officially turned over to the Air Force on 20 May, having been redesignated XF-92A. Shannon and Martin continued to fly the airplane during the transition, a maximum speed of Mach 0.925 being reached without encountering any adverse control effects.

But the airplane was still underpowered. As flight tests continued under Air Force auspices, Allison was developing a new, more powerful engine with something called an afterburner, developing over 7,500 pounds of thrust, and the Air Force elected to use it in the XF-92A. Installation of the new Allison J33-A-29 required extensive fuselage redesign to enclose the afterburner and took over a year to complete, and the airplane was not returned to Edwards AFB until July 1951.

Due to problems with the -29 engine, the XF-92A had made only 21 flights by the time tests of the new powerplant had been concluded in February 1953. But one of these flights saw the airplane finally go supersonic, when Air Force test pilot Chuck Yeager took his turn at the controls. In the fall of 1951 Major Yeager took the re-engined aircraft for a test flight, flipped it onto its back, and went into a high-speed dive. The machmeter recorded 1.10, the first and only time the XF-92A would break the sound barrier.

Following the Air Force tests, in 1953 the XF-92A was turned over to the National Advisory Committee on Aeronautics (the forerunner of today's National Aeronautics and Space Administration) which installed yet another engine, an Allison J33-A-16 of 8,400 pounds afterburning thrust, and a drag chute. Following a landing accident, NACA elected not to repair the aircraft and returned it to the Air Force, which retired it in 1954. During a three-year program of development, the XF-92A had made a total of 118 test flights and contributed significantly to the science of delta wing aerodynamics. It now resides at the U.S.A.F. Museum alongside other exotic test aircraft.



With the addition of an afterburner to its J33-A-29 engine, the XF-92A was finally able to exceed Mach 1. In the fall of 1951 Maj. Chuck Yeager went supersonic in the XF-92A – in a dive! (AFFTC)

The 1954 Interceptor YF-102 (Model 8-80)

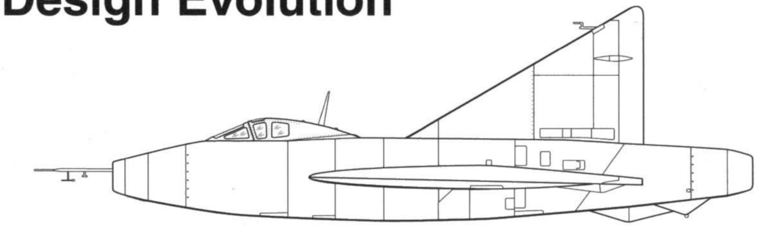
With the Soviet Union's successful test of an atomic bomb in 1949, the United States no longer enjoyed nuclear supremacy. The Soviets also had a delivery system for their new weapon in the Tupolev TU-4, a direct copy of the Boeing B-29 Superfortress. The news of the Soviets' nuclear capability startled the entire world, and the U.S. Air Force started a crash program to make the skies over the Free World as safe as possible.

Officially this program was known as Secret Project MX-1554 — code name "DRAGONFLY" — but unofficially it was called the "1954 Interceptor Program," so named because the Air Force wanted the aircraft operational by 1954. The Air Force's requirement was simple: an airplane that would surpass the estimated performance, both in speed and altitude, of any Soviet intercontinental jet bomber then in development or projected. Specifically, it called for a speed greater than Mach 1 in level flight, with a service ceiling greater than 50,000 feet

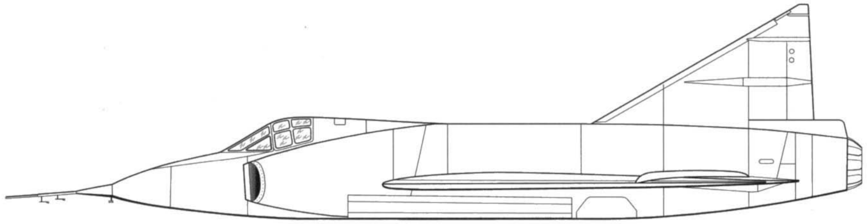
Project MX-1554 would be directly tied to the development of the Hughes MX-1179 radar fire control system and the new Hughes GAR-1 Falcon air-to-air interceptor missile. These two programs, when combined with the new aircraft design, were known as Weapons System 201A. On 18 June 1950, the Air Force asked for proposals from several companies for the "1954 Interceptor." Convair was one of the companies to answer the Air Force's request.

The Convair proposal was aircraft model 8-80. The model 8-80 had a general appearance not unlike the XF-92A. It used basically the same thick delta wing and tail as the XF-92A but was larger overall. The fuselage was longer by 10 feet with engine air intakes on the sides of the fuselage under the cockpit instead of a single nose intake. The pointed nose was longer to house the proposed MX-1179 radar system. Power was slated to come from a single Wright J67 (⏩ 7)

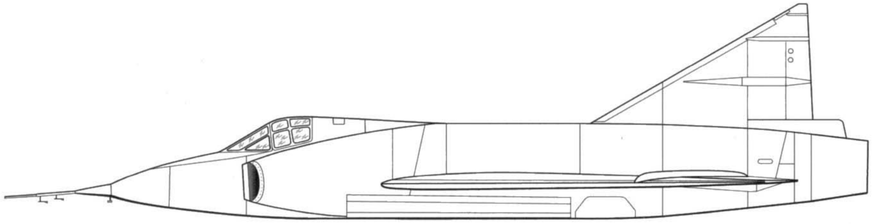
F-102A Delta Dagger
Design Evolution



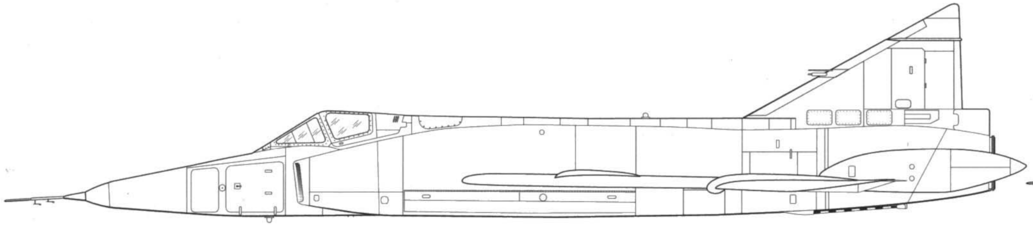
XF-92A



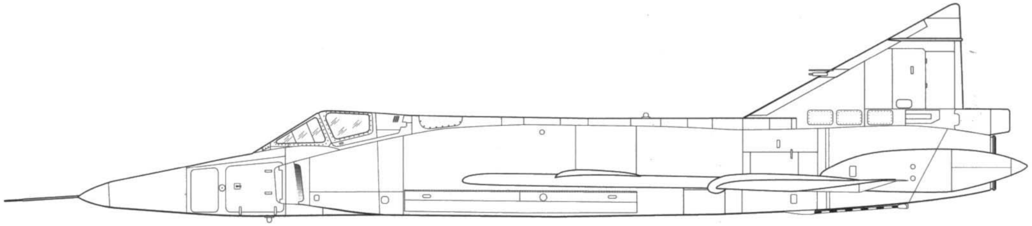
YF-102



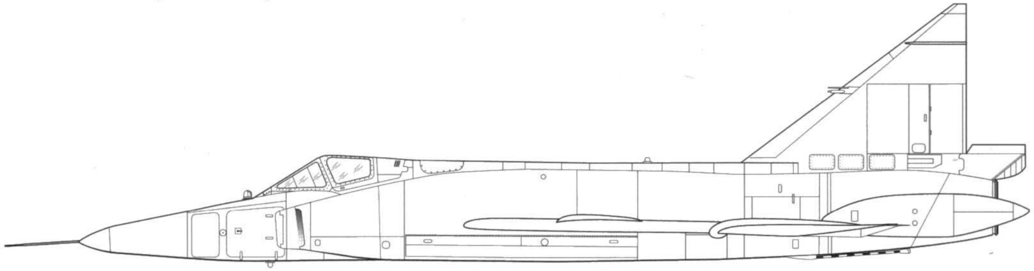
Revised YF-102



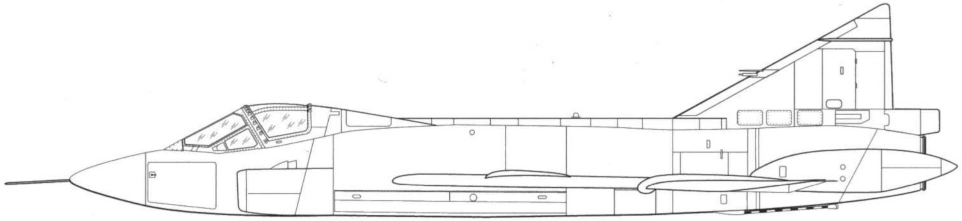
YF-102A



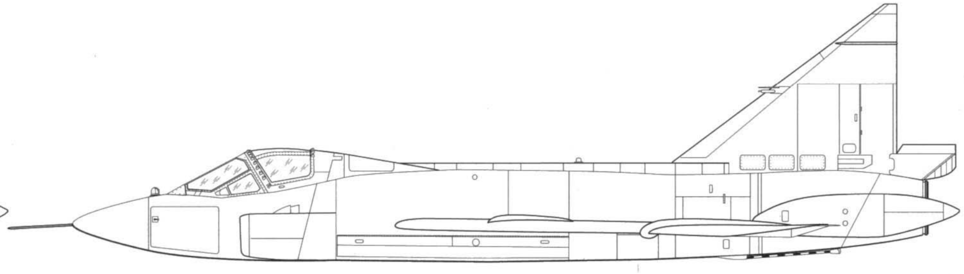
F-102A (short tail)



F-102A (tall tail)



TF-102A (short tail)



TF-102A (tall tail)

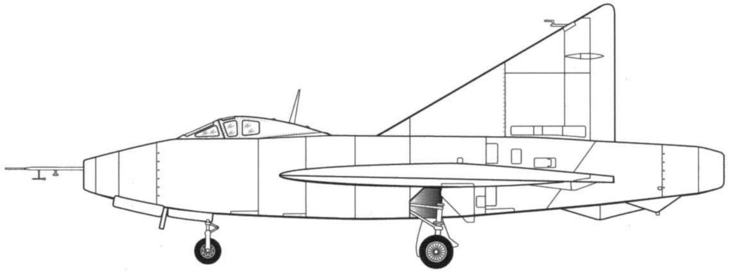
turbojet, rated at over 15,000 pounds of thrust in afterburner. The fuselage was bulkier than that of the XF-92A in order to house the internal weapons bay and six GAR-1 Falcon missiles.

But problems beyond Convair's control would hinder development of the new aircraft, now designated F-102. Both engine and radar were way behind schedule in development. Accordingly, the Air Force decided to allow Convair to substitute a conventional Hughes MG-3 radar, a modified Hughes E-9 unit that was already in production for the F-86D, in the prototypes. Development of the Wright J67 engine was so far behind schedule that the Air Force also authorized Convair to completely change the powerplant to the newly developed Pratt and Whitney JT3 (production designation J57).

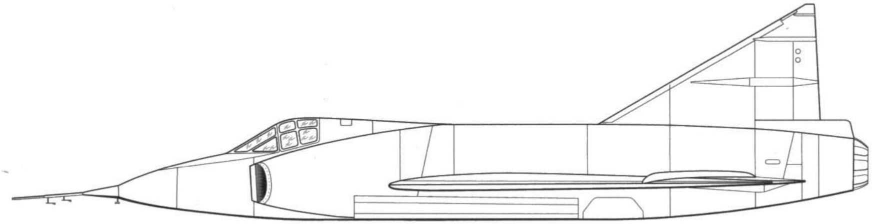
The biggest problem, however, lay undiscovered until August 1952, when Convair wind tunnel tests of the proposed design indicated that the new aircraft would not be capable of breaking Mach 1, even with the greater thrust of either the Wright J67 or the new Pratt & Whitney J57. The cause was drag throughout the transonic speed range (Mach 0.9 to Mach 1.1), a problem which baffled the Convair engineers but one which NACA aerodynamicist Richard Whitcomb had already been studying.

Whitcomb theorized that drag could be reduced by decreasing the cross-sectional area over which the drag was encountered. In the case of the F-102, the drag was encountered along the fuselage. By "pinching" the fuselage over the region where the wing was attached, its cross-sectional area would be reduced, thus decreasing drag. Wind tunnel tests proved Whitcomb's theory to be correct, especially throughout the transonic speed ranges. The Convair engineers rushed back to San Diego with the new data and began a complete redesign of the YF-102 fuselage that reflected this new "area rule" principle, resulting in what is commonly referred to as a "wasp-waist" or "Coke bottle" fuselage. However, the redesigned, area-ruled fuselage could not be incorporated into the YF-102 service test aircraft that were already in production. (▶▶ 9)

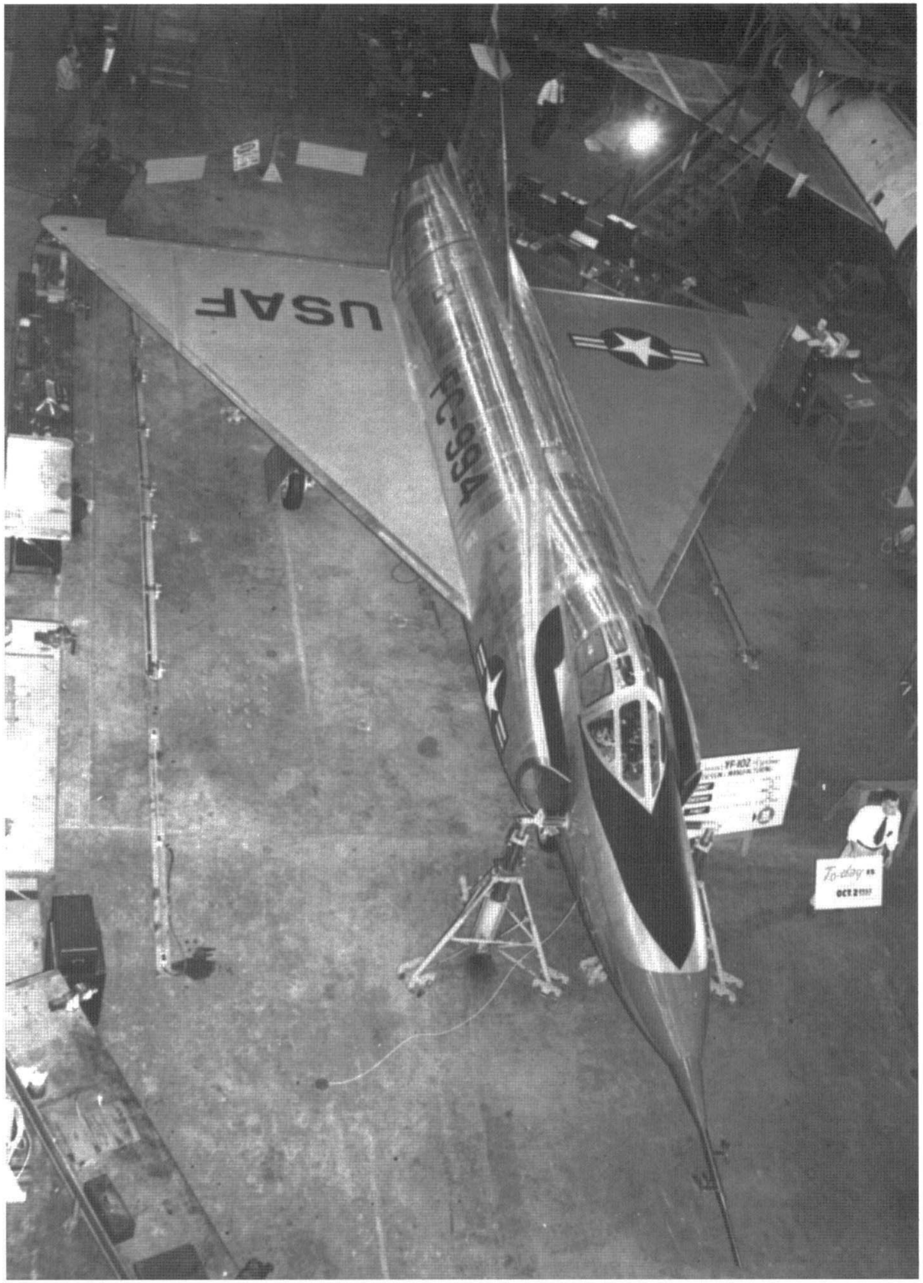
XF-92A to YF-102



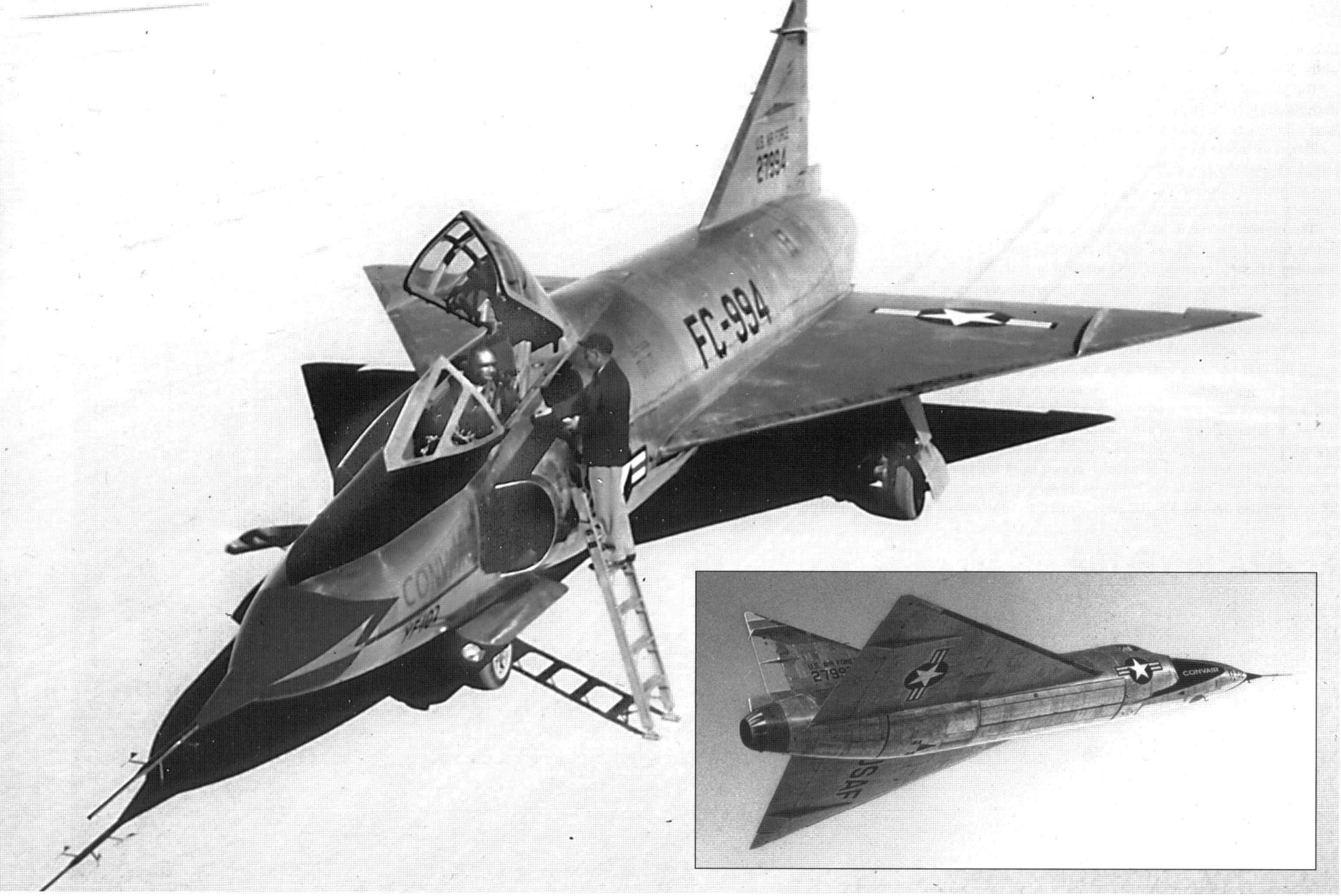
XF-92A



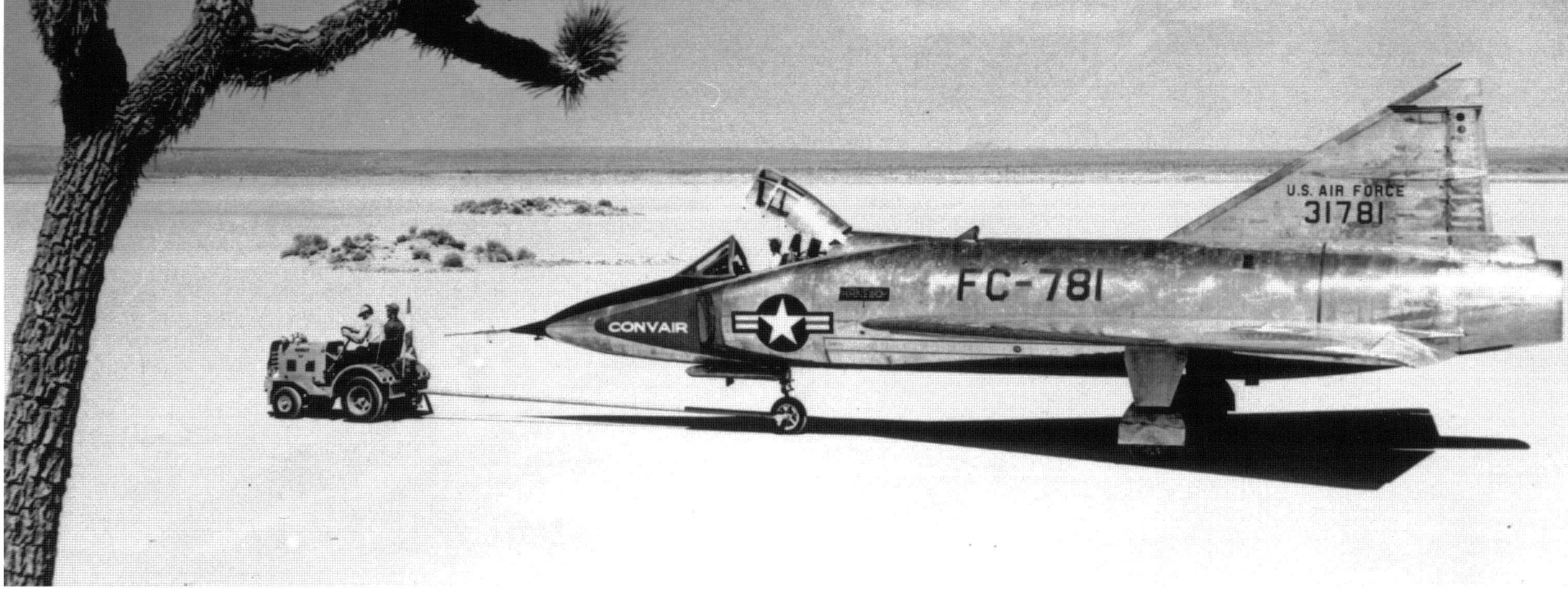
YF-102



The YF-102 just prior to rollout at Convair's San Diego plant in September 1953. Essentially a larger version of the XF-92A, the YF-102 was powered by a Pratt & Whitney J57-P-11 engine rated at 14,000 pounds thrust, but could not break the sound barrier in level flight. (via David Menard)



A Convair employee checks with Chief Test Pilot Dick Johnson immediately after the first flight of the YF-102 on the ramp at Edwards AFB Flight Test Center on 24 October 1953. Early tests indicated that even with the added power of the J57 engine, the YF-102 would only break the sound barrier in a dive. The YF-102 was destroyed in a crash on 1 November 1953. (via Robert F. Dorr) Inset: The second YF-102 made its first flight on 11 January 1954. This aircraft had several minor changes such as revised intake openings and a redesigned canopy in an attempt to make it supersonic in level flight, but they were unsuccessful. (AFFTC)



The fifth YF-102 is towed to the flight line at Edward AFB in spring 1954. The fuselage has been extended and greatly enlarged through the tailpipe. The internal weapons bay doors can be discerned under the wing leading edge. Armament was slated to be multiple Hughes GAR-1 Falcon missiles. (via Robert F. Dorr)

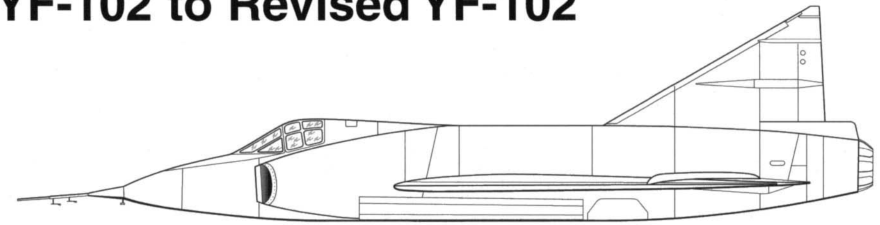
Service Test Aircraft
YF-102 (Model 8-82)

The YF-102 was 52 feet 6 inches in length, with a 38-foot wingspan. From the ground to the tip of the tail, it was 18 feet 2 inches in height — almost exactly a third larger than the XF-92A. The YF-102 had a gross weight of over 26,400 pounds. Problems with development of the Wright J67 engine led to a decision to change the powerplant to the Pratt & Whitney J57 engine. Maximum speed with the proposed Pratt & Whitney J57-P-11 engine was estimated to be 870 mph, but that speed would not be achievable until the first area-ruled aircraft came off the assembly line.

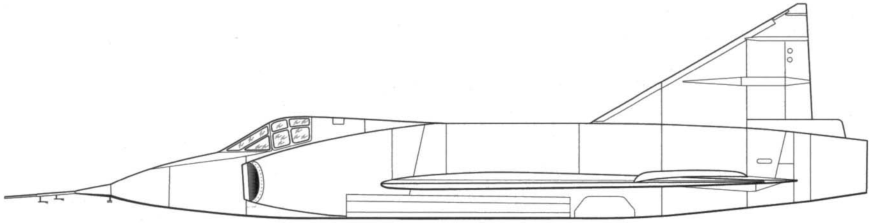
The first YF-102, Air Force serial 52-7994, was rolled out in September 1953 then loaded on a truck and transported to Edwards Air Force Base. Ground testing revealed no significant problems, and a first flight date was set. In the early morning hours of 24 October 1953, Convair Chief Test Pilot Richard 'Dick' Johnson pushed the throttle forward, and the YF-102 easily lifted from the Edwards runway. That first flight was very smooth. However, further test flights proved that the YF-102 was not able to exceed the speed of sound in level flight, one of the major Air Force requirements for the "1954 Interceptor." Only in a dive could the YF-102 break the sound barrier, and on 1 November, during one of these dives, the engine flamed out. Try as he might, Johnson could not get an air start and was forced to eject. Johnson parachuted to safely, but the YF-102 was destroyed.

The second YF-102 made its first flight on 11 January 1954, and YF-102s numbers three through 10 soon followed from the San Diego assembly line. Several changes were made (▸▸ 11)

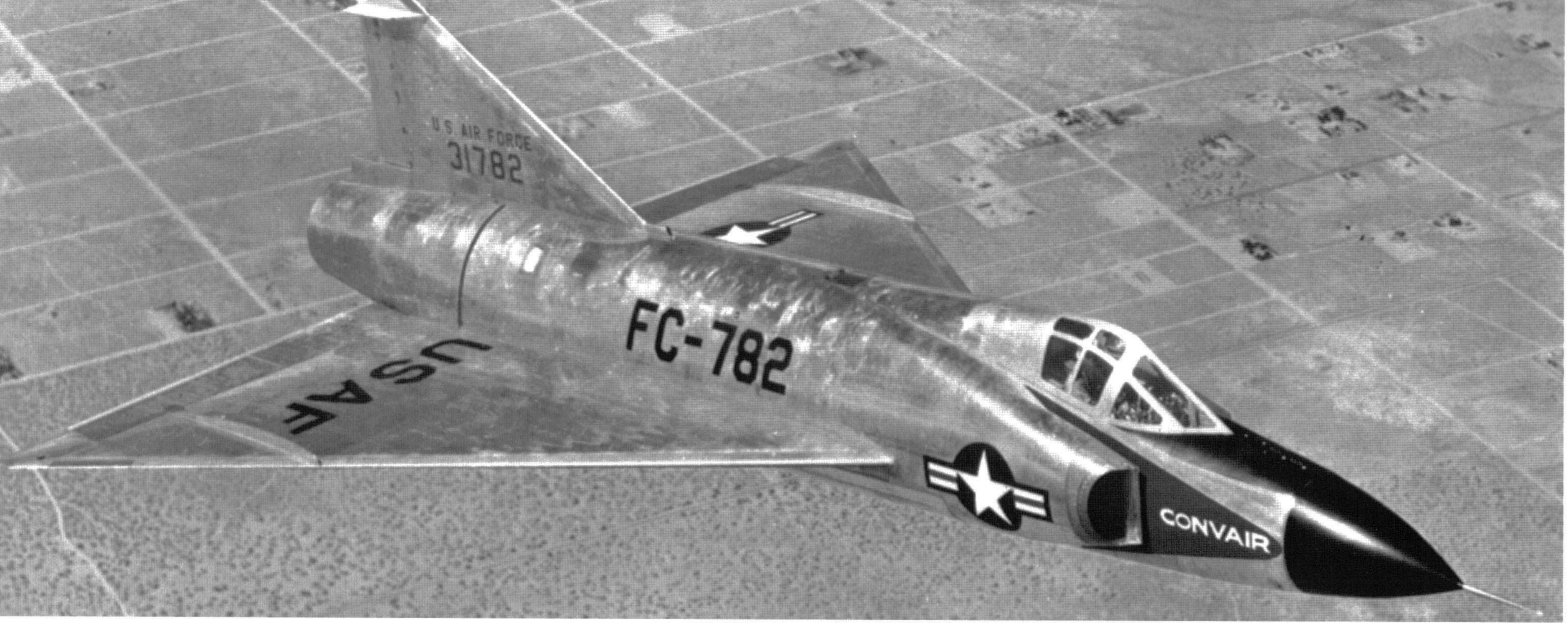
YF-102 to Revised YF-102



YF-102



Revised YF-102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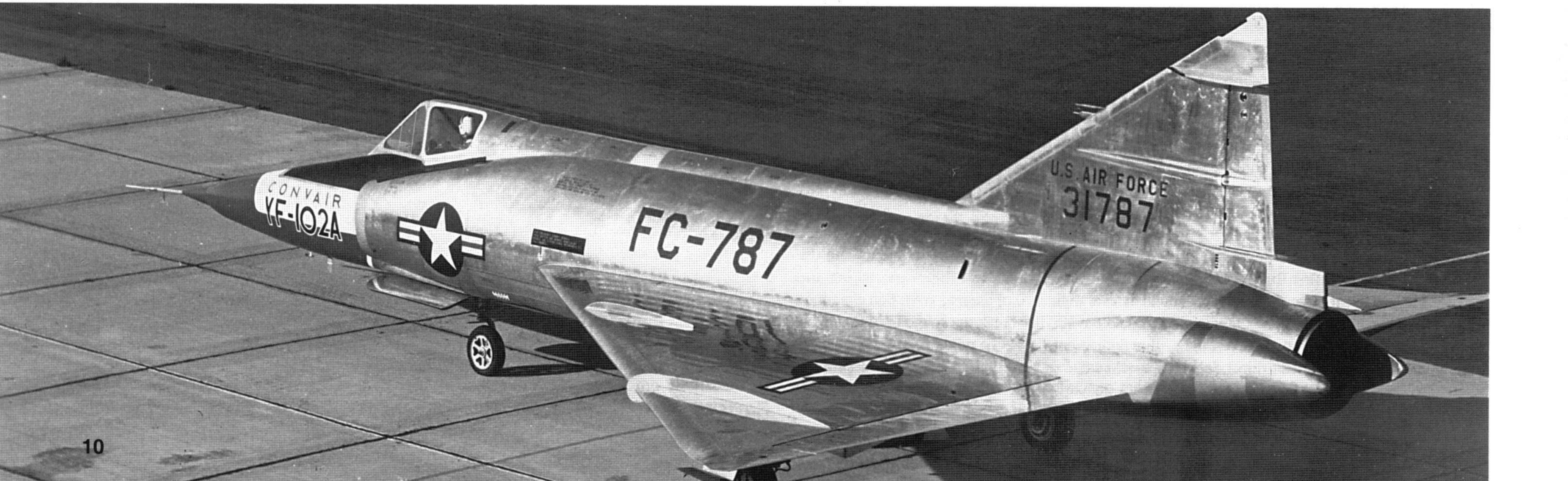
(Above) The sixth YF-102 prototype in flight over Southern California in spring 1954. This YF-102 was the first to have a fiberglass radome. The reshaped air intakes can be seen, as can the heavy framing on the wide canopy and windscreen used on the YF-102s. (via Robert F. Dorr)

(Below) The YF-102A taxies to the active runway at Lindbergh Field in San Diego. The YF-102A was much different from the earlier YF-102 in having an area-ruled fuselage, commonly called a "wasp waist." (via Robert F. Dorr)


CONVAIR
YF-102A
FC-787
U.S. AIR FORCE
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to the basic design in an attempt to increase the top speed without incorporating the "area rule" changes. These included revising the air intakes, completely changing the canopy to include a sharp v-shaped windscreen, and lengthening the forward fuselage for a better fineness ratio. However, none of these alterations helped increase the top speed above Mach 0.98, and Convair engineers were forced to incorporate the "area rule" concept in a redesigned fuselage.

The YF-102A (Model 8-90)

The YF-102A, model 8-90, was the first of the true "1954 Interceptor" variants as it was the first to meet all the requirements. Most of this was directly achieved by incorporating the area rule, further refinements to the fuselage, and additional power. But redesigning the fuselage would be very costly. Of the 30,000 tools that were already finished for the YF-102, over 20,000 had to be scrapped or modified to construct the YF-102A.

Area ruling called for the fuselage to be pinched just aft of the wing leading edge to fuselage juncture. This indented area continued almost to the wing trailing edge. In addition, the fuselage was lengthened about 7 feet for a greater fuselage fineness ratio. The engine air intakes were also redesigned and enlarged for more volume, which would be needed when the more powerful J57-23 engine was installed. The -23 engine had over 16,000 pounds thrust compared to 14,000 pounds in the -11 engine that powered the YF-102. And the -23 engine's extra power was needed to compensate for the YF-102A's 3,500-pound weight gain over the YF-102.

An entirely new and thinner wing necessitated still more changes in tooling. The thinner wing was 38 feet in span and had "flow fences" to smooth the airflow over the elevons. In addition, the leading edge of the wing was cambered, or curved downward, for additional lift, while the wing tips were bent upward. Convair referred to this design as the "Case X" wing. All of this was done in the name of greater speed. Also, to maintain a better balance and center of gravity, both the wing and vertical tail were moved three feet to the rear.

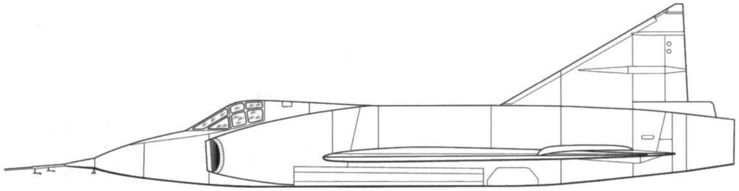
However, wind tunnel testing indicated that the area-ruled fuselage was not enough. It needed even more "pinching." But because the fuselage simply couldn't be pinched any further, Convair engineers came up with a novel idea. Instead of pinching the fuselage in, they would bulge the fuselage out by adding a large fairing on both sides of the aft fuselage. These fairings further reduced drag and also created additional space for extra fuel and engine accessories. The Convair engineers laughingly referred to these bulges as "love handles."

On 15 November 1954, the literally all-new YF-102A, Air Force serial 53-1787, was rolled out at the San Diego plant. Within days it was trucked up the California coast to Edwards AFB and made ready to fly. On 20 December Dick Johnson made his second "first flight" in an F-102. The YF-102A lifted off the runway, and Johnson ran the gamut of first flight tests before returning to Edwards. No problems were encountered, and the YF-102A was readied for the ultimate test — breaking the sound barrier. On 21 December, Johnson again strapped himself into the YF-102A's cockpit and took off. After a quick check of the flight systems and controls, he put the aircraft into a slight climb and punched the afterburner. Within a scant few seconds the machmeter read an incredible Mach 1.22 . The YF-102A was supersonic!

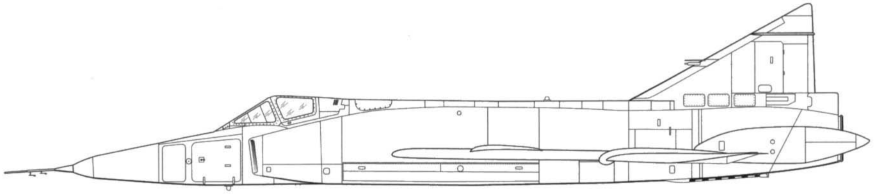
Further improvements included the addition of four more feet to the area-ruled fuselage to further improve the fineness ratio of the fuselage. The YF-102A/F-102A would be 63.3 feet in length. The wing leading edge camber was also adjusted. Finally, a weight reduction program was initiated, as the YF-102A had gained a considerable amount of weight with all the fuselage modifications required by the "area rule."

(▸▸ 13)

Revised YF-102 to YF-102A



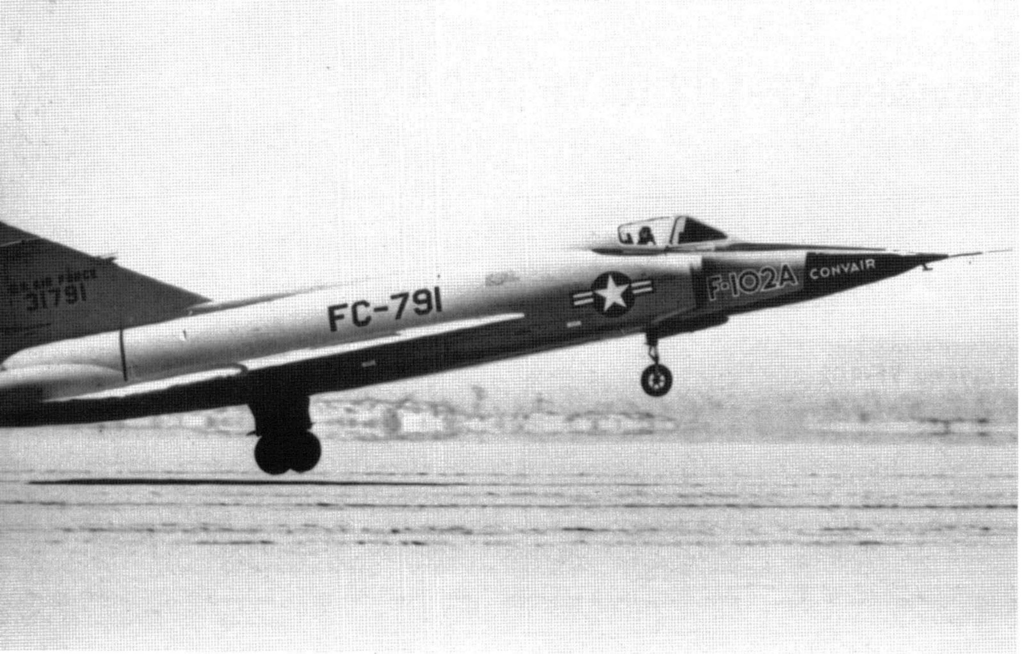
Revised YF-102



YF-102A

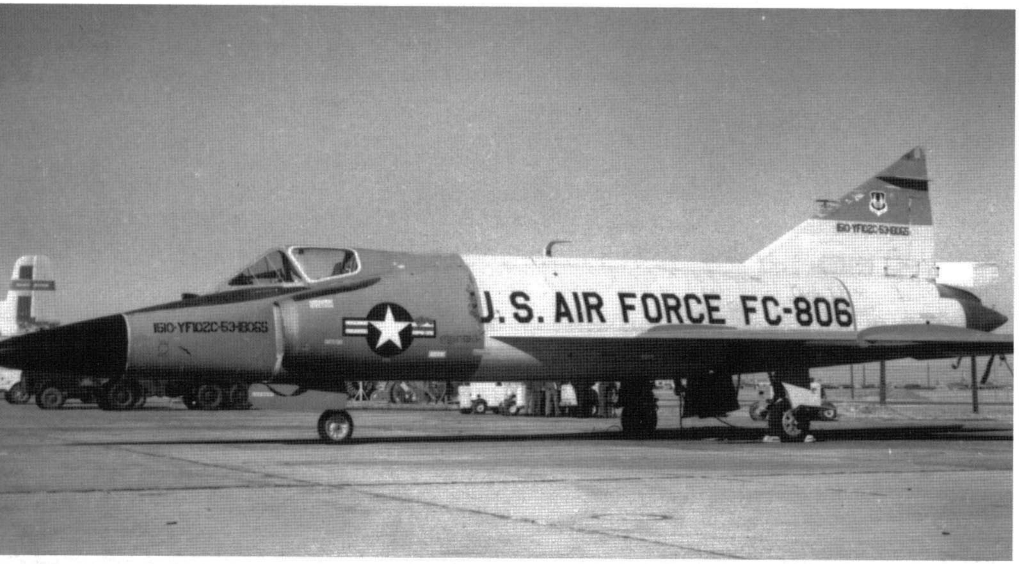
Convair Chief Test Pilot Dick Johnson in the YF-102A over the California high desert in early 1955. Johnson took the YF-102A on its first flight on 20 December 1954 and broke the sound barrier in level flight the next day. The YF-102A featured the redesigned, narrow windscreen. (AFFTC)

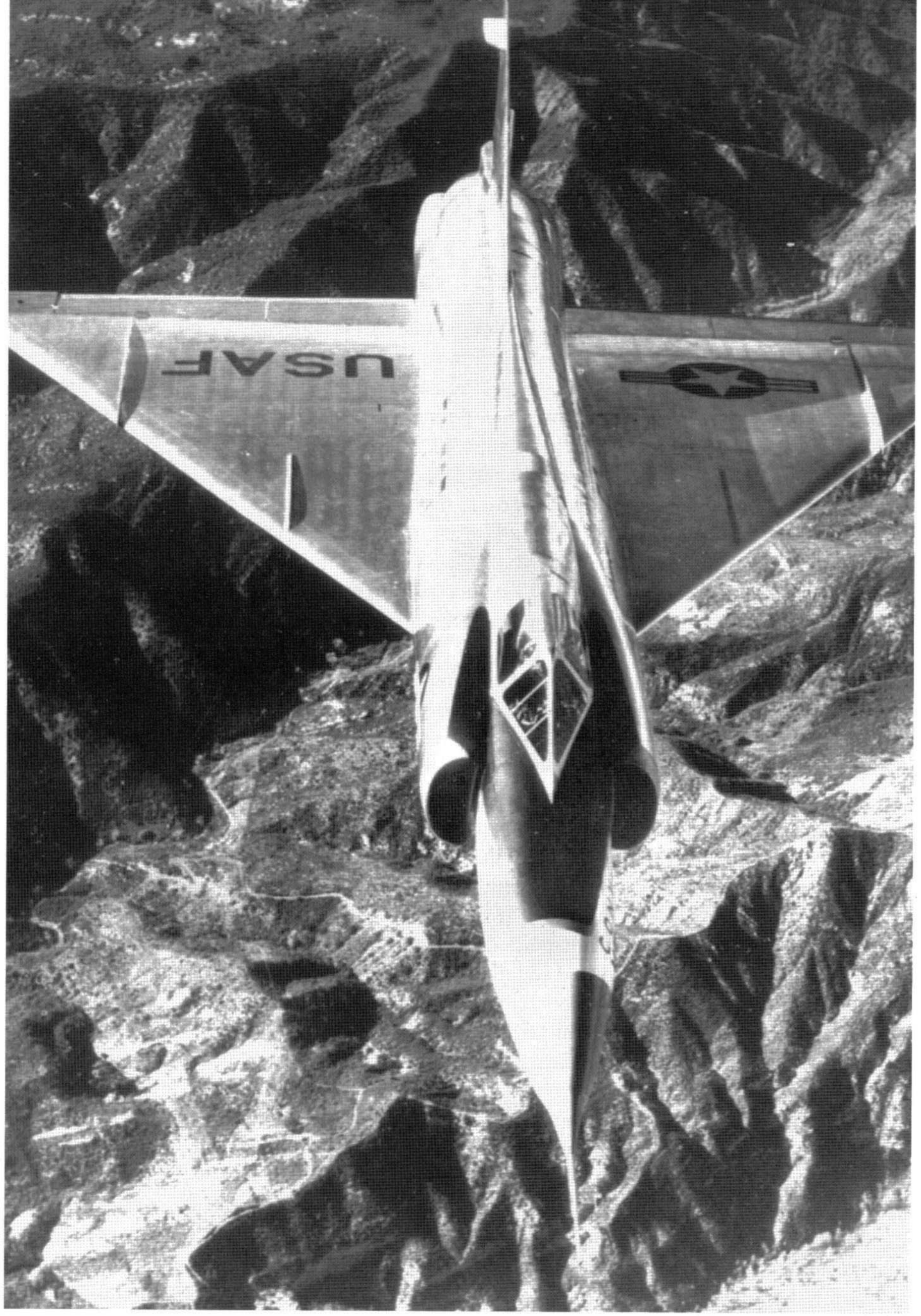
U.S. AIR FORCE
31787
FC-787
CONVAIR
YF-102A



(Above) Convair's Dick Johnson touches down in the first production F-102A, serial 53-1791, on 24 June 1955. This was the first of the so-called "Hot Rod" F-102As — reduced in weight, and having an area-ruled fuselage and the 16,000-pound thrust J57-23 engine. (David Menard)

(Below) A YF-102C on the ramp at Sheppard AFB, Texas, in 1955. Two YF-102Cs were modified from F-102As as engineering testbeds for a proposed version of the Delta Dagger intended as a transition to the F-106. This YF-102C (serial 53-1806) was painted overall Aircraft Grey with DayGlo Red nose, wings, and tail surfaces. (Merle Olmsted)





(Above) This view of the YF-102A shows its area-ruled fuselage to advantage. Area ruling lessened aerodynamic drag along the fuselage, and less drag is equal to a gain in performance without a gain in power. The wing of the YF-102A also had an additional pair of wing fences nearer the wing root to direct air flow over the control surfaces. (AFFTC)

F-102A (Model 8-10)

The production F-102A was externally indistinguishable from the YF-102A service test aircraft. Production aircraft would have all the refinements that were carried out and/or adjusted in the YF-102/YF-102A plus two additional items: full armament and a fire control radar system. Production aircraft were fitted with the Hughes MG-3 radar fire control system (FCS). The much-anticipated Hughes MX-1179 fire control system was now slated to be installed in the follow-on interceptor, the F-102B. However, because of all the differences between the F-102A and the F-102B, the Air Force changed the designation of the F-102B "Ultimate Interceptor" to F-106.

The MG-3 FCS went into production in 1955, just in time to be installed in production variants of the F-102A. However, heightened requirements and further development led to additional improvements in the MG-3. These included an automatic flight control system and a data link based on the SAGE (Semi-Automatic Ground Environment) system that was already being installed in previous interceptor types like the F-86D. This allowed a real-time link between the ground controller and the interceptor pilot for instantaneous information upgrades. The new FCS was designated the Hughes MG-10.

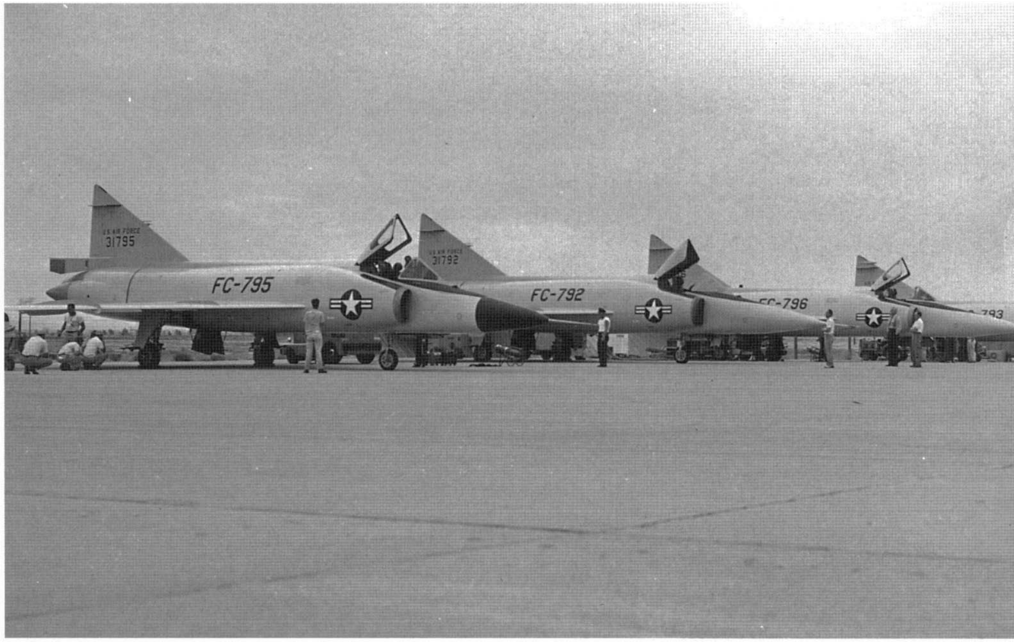
Armament for the "1954 Interceptor" was of the all-missile variety. The main armament would be six Hughes GAR-1 Falcon missiles (redesignated AIM-4 in 1962). The GAR-1 was directly linked to the MG-3/MG-10 FCS. The F-102A was capable of launching several different types of Falcon missiles, including the GAR-1 (AIM-4) radar guided missile; the GAR-1A (AIM-4B), which was an improved Falcon; the GAR-2A (AIM-4C) which had an infrared homing capability; and the GAR-11 (AIM-26A) Super Falcon, which could have a nuclear warhead. Additionally, the F-102A would have a secondary armament of at least 24 2.0-in. folding fin aircraft rockets (FFAR) carried within the edges of the missile bay doors. However, beginning with the block-51 aircraft, the 2.0-in. FFARs were replaced with 2.75-in. "Mighty Mouse" FFARs.

The final major change to the production F-102A was in the size of the vertical fin. Initial flight tests had indicated a flutter and lack of directional control with the original tail design. The first 25 F-102As had a vertical tail with a height of 18 feet 2 inches. Convair engineers designed a new larger and taller fin that was 21 feet 2 ½ inches in height with a 10-inch longer base chord. This new larger, taller fin greatly increased directional stability and was incorporated on all production F-102As beginning with the block-25 aircraft. The taller tail was also retrofitted to all previous YF/F-102A aircraft.

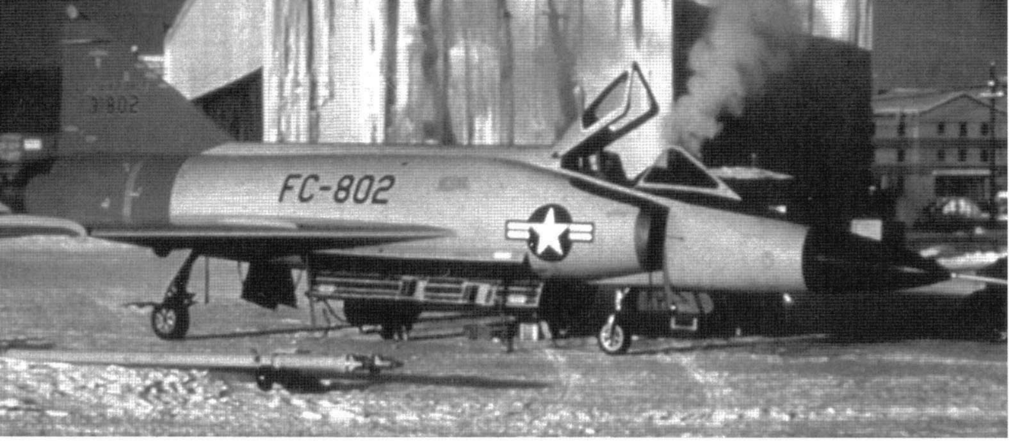
The first flight of a production F-102A, serial 53-1791, was made 24 June 1955, and the Air Force accepted the airplane on 29 June, officially naming it "Delta Dagger," although it would be more commonly known as the "Deuce" throughout its service life. The first batch of production F-102As were delivered to training squadrons for use by future Air Defense Command pilot trainees. In April 1956, production F-102As, albeit with the shorter tail and earlier MG-3 FCS and weapons, entered service with the 327th Fighter Interceptor Squadron based at George AFB, California.

(▸▸ 18)

(Above) A crew chief at George AFB guides the first operational aircraft to its parking spot. The first operational F-102As were delivered to the 327th FIS at George AFB in April 1956, almost two years to the day later than the Air Force originally had intended the "1954 Interceptor" to be operational. (Convair)

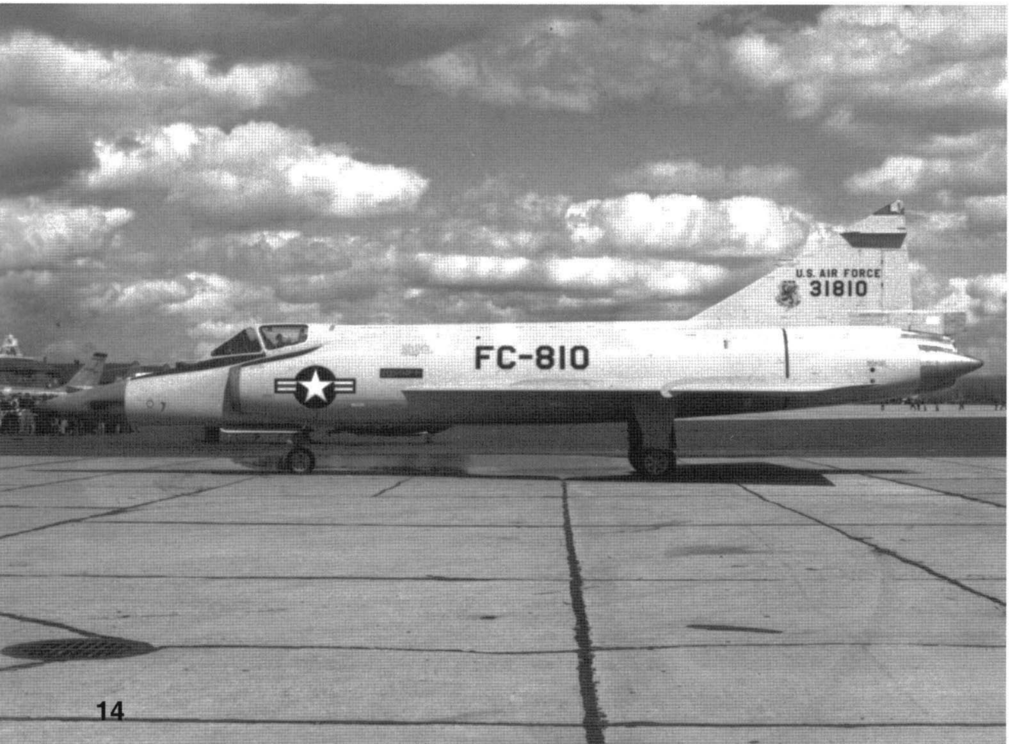


(Right) Production F-102A-5s on the ramp at Edwards AFB during late summer, 1955. The production version of the F-102A was over 16 feet longer than the original YF-102 prototype aircraft. The all-grey noses of the second and third aircraft give the illusion that they are longer than the aircraft in the foreground, but in fact they are the same length. (via Robert F. Dorr)

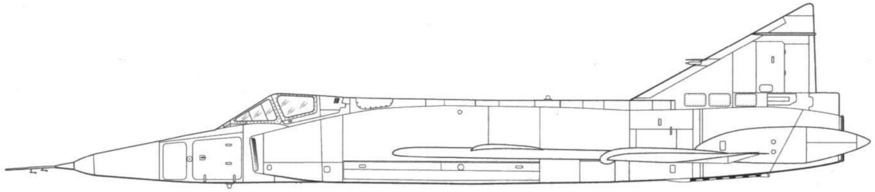


Since the F-102 was slated to defend the United States from attacks over the North Pole, they would be deployed to areas of extreme cold weather. In March 1956 the last F-102A-15 was sent to Ladd AFB, Alaska, where the temperature often reached 40 degrees below zero, for cold weather tests. (Jack Freeberger)

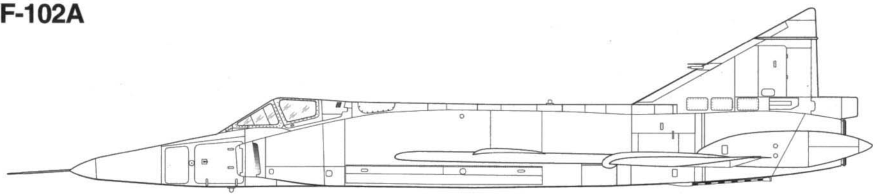
(Below and Below Right) One of the biggest complaints of F-102 pilots was tail flutter and directional instability at high Mach numbers. Convair engineers redesigned the vertical fin, making it three feet taller and increasing the chord by almost a foot. On the left is F-102A-20, serial 53-1810, from Air Proving Ground Command at Eglin AFB, Florida, with its original short tail and engine intakes. On the right is the same airplane in 1960 serving with the 496th FIS at Hahn AB, West Germany, with the taller fin, larger dive brake doors, and intake ramps. (Wm. J. Balogh Sr. and David Menard)



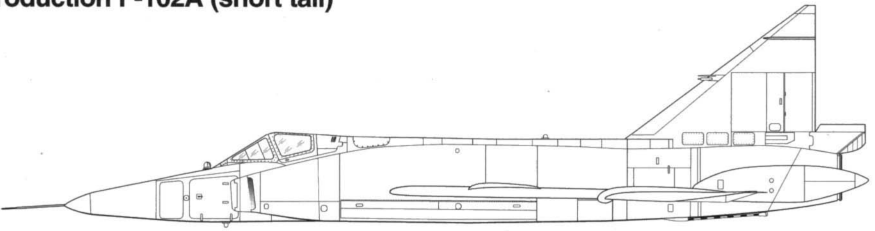
YF-102A to Production F-102A



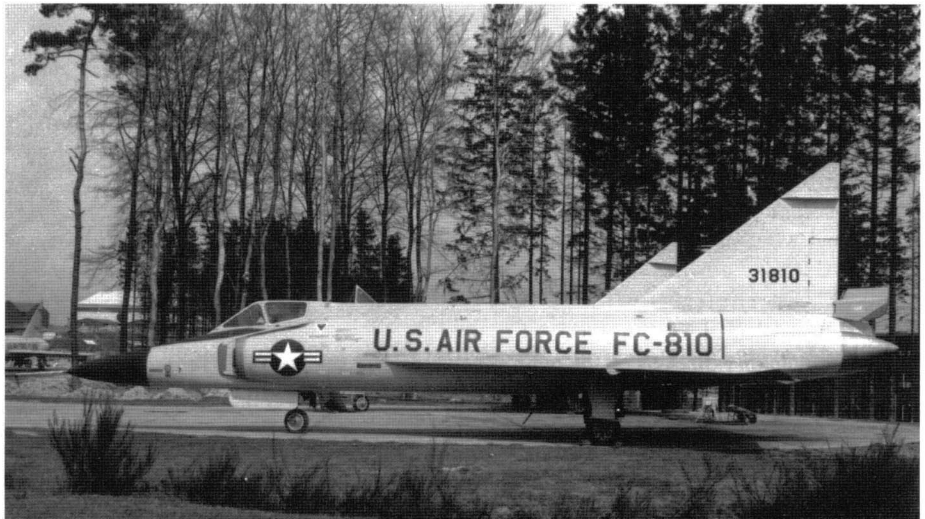
YF-102A

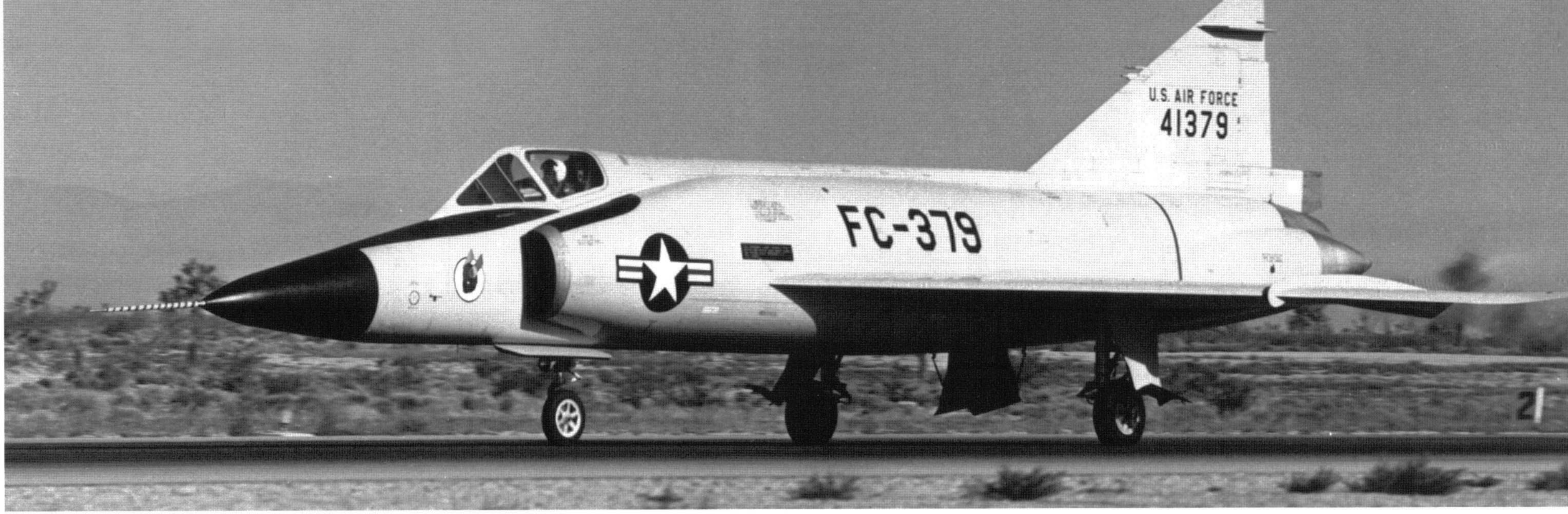


Production F-102A (short tail)



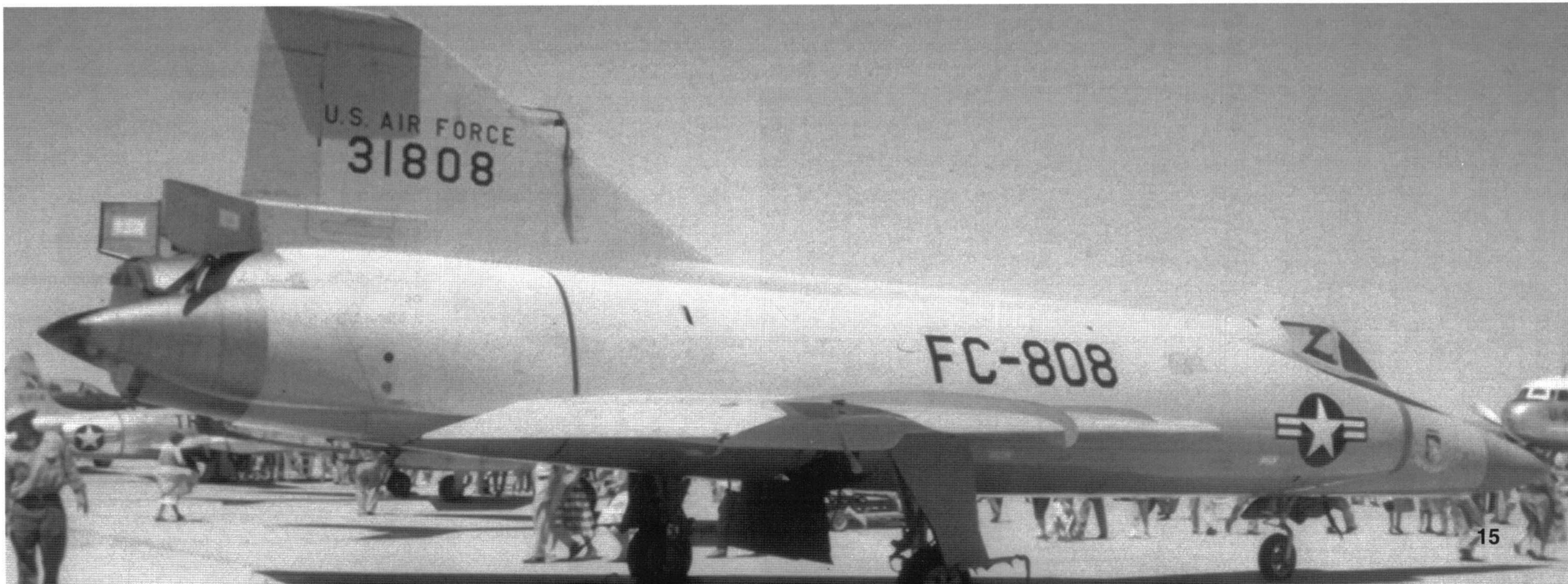
Production F-102A (tall tail)

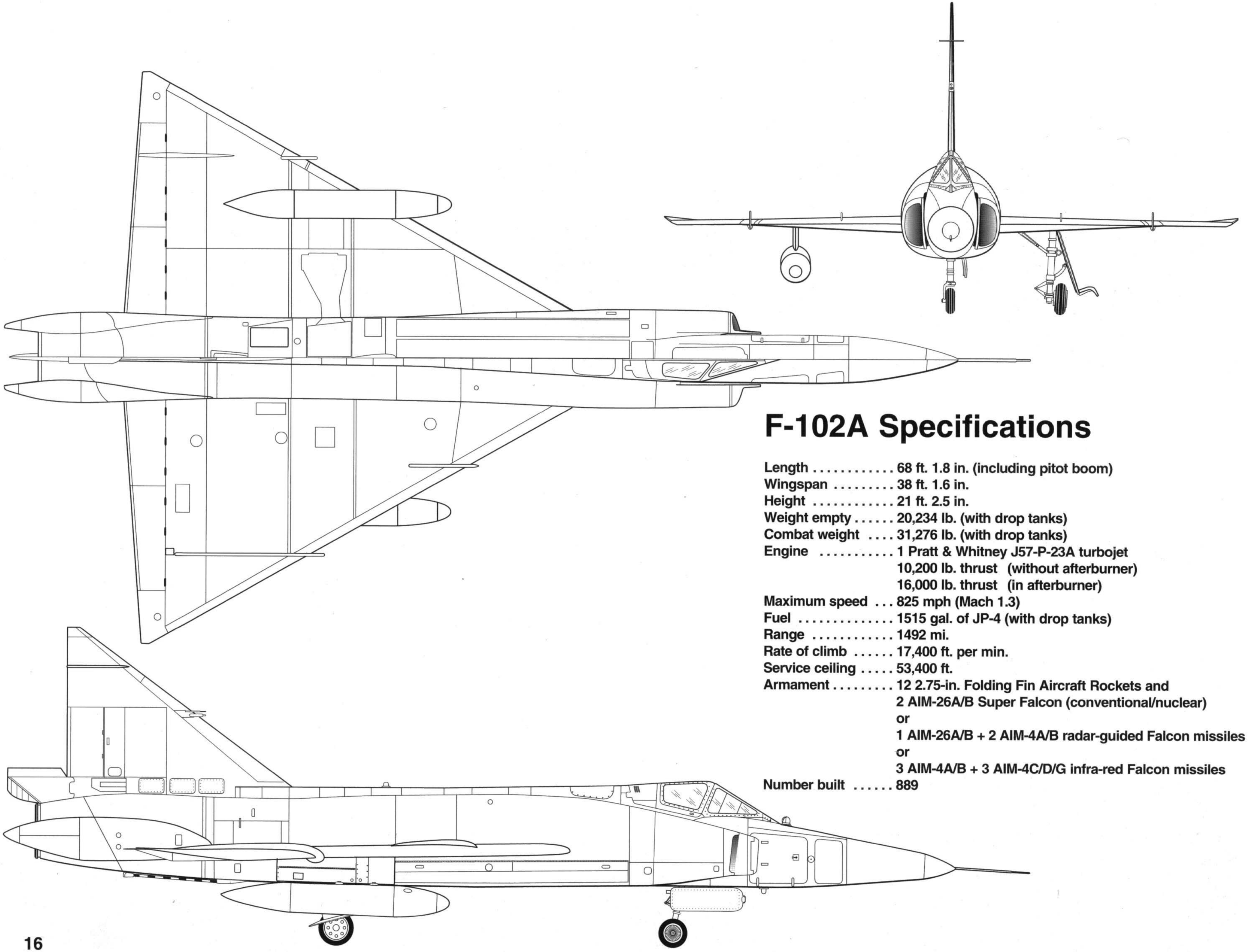




An F-102A-30 assigned to the 327th Fighter Interceptor Squadron at George AFB, California. The first combat unit to operate the F-102A, the 327th FIS received the first production aircraft in April 1956. The 327th FIS was charged with air defense of the Los Angeles area, at the time the most vital area in the United States for aviation manufacturing. (Convair)

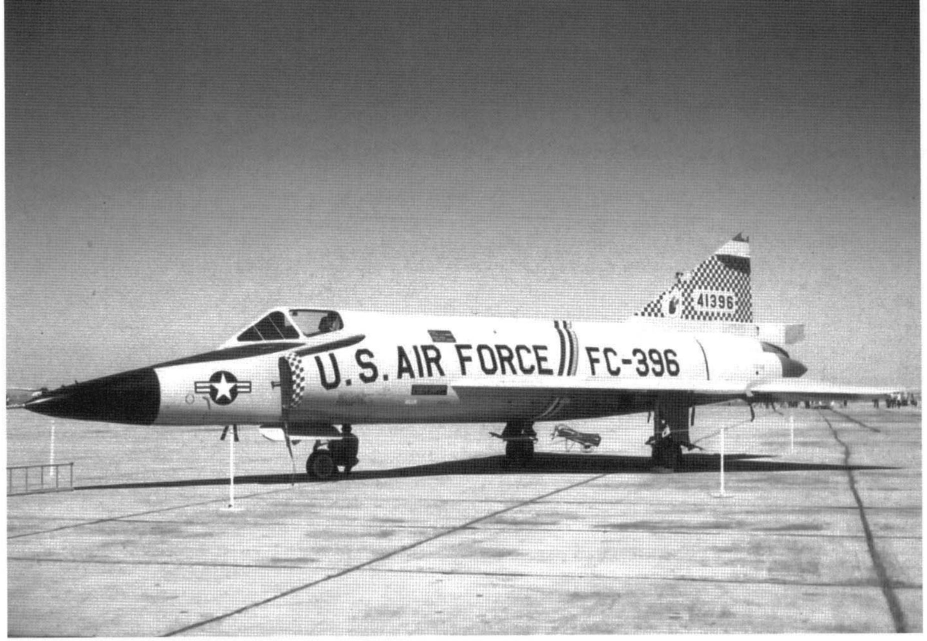
An F-102A-20 assigned to Air Research and Development Command on the ramp at Edwards AFB in May 1956 for an open house. All production F-102As had the very pronounced rear fuselage bulges, also known as "love handles," which were added to both decrease drag and increase internal space. (Budd Butcher)





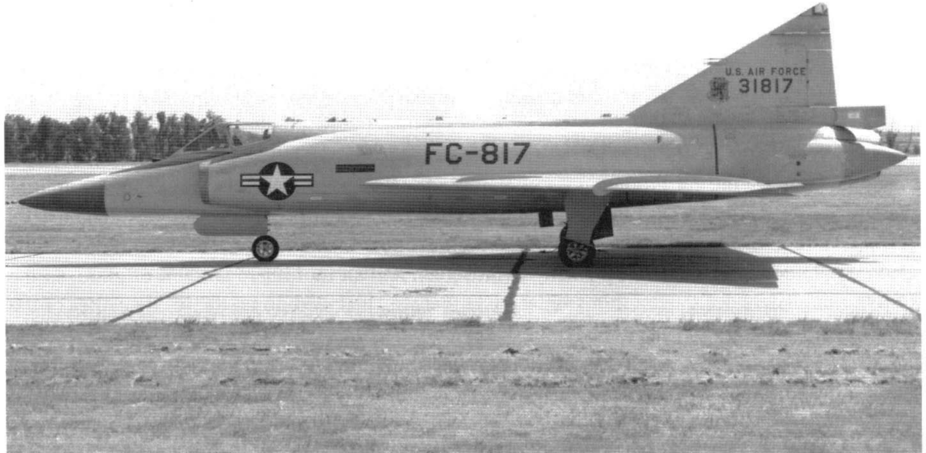
F-102A Specifications

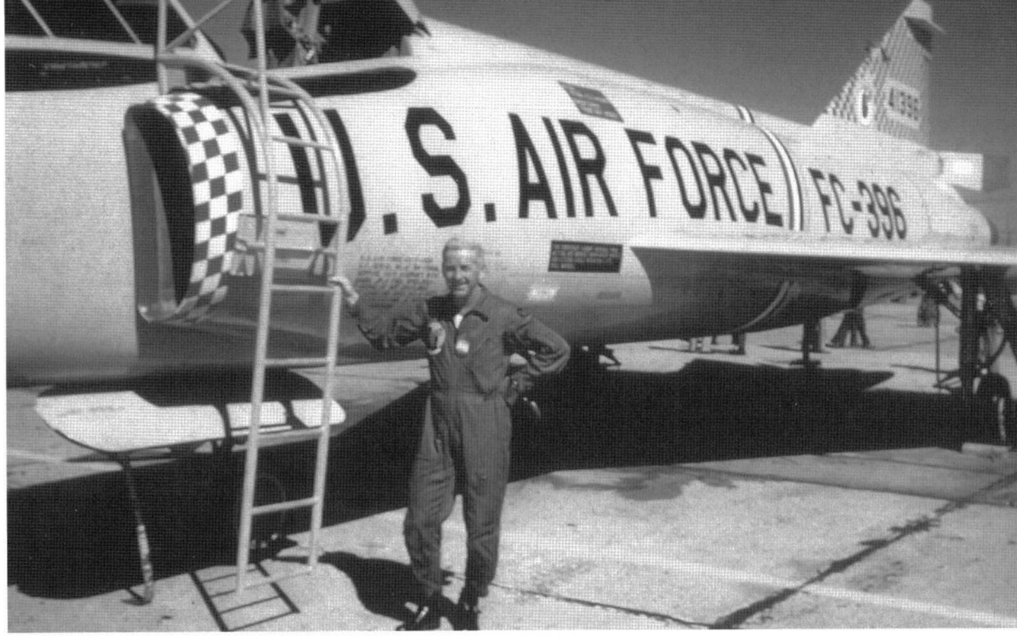
Length	68 ft. 1.8 in. (including pitot boom)
Wingspan	38 ft. 1.6 in.
Height	21 ft. 2.5 in.
Weight empty	20,234 lb. (with drop tanks)
Combat weight	31,276 lb. (with drop tanks)
Engine	1 Pratt & Whitney J57-P-23A turbojet 10,200 lb. thrust (without afterburner) 16,000 lb. thrust (in afterburner)
Maximum speed	825 mph (Mach 1.3)
Fuel	1515 gal. of JP-4 (with drop tanks)
Range	1492 mi.
Rate of climb	17,400 ft. per min.
Service ceiling	53,400 ft.
Armament	12 2.75-in. Folding Fin Aircraft Rockets and 2 AIM-26A/B Super Falcon (conventional/nuclear) or 1 AIM-26A/B + 2 AIM-4A/B radar-guided Falcon missiles or 3 AIM-4A/B + 3 AIM-4C/D/G infra-red Falcon missiles
Number built	889



Col. Charles Rigney's personal F-102A-35 on the tarmac at Oklahoma City in September 1956. Col. Rigney was commander of the 327th FIS at George AFB and had his aircraft painted with red checks on the intakes and tail and red, white, blue, and yellow command bands around the fuselage. The placement of the national insignia is unusual. (Budd Butcher)

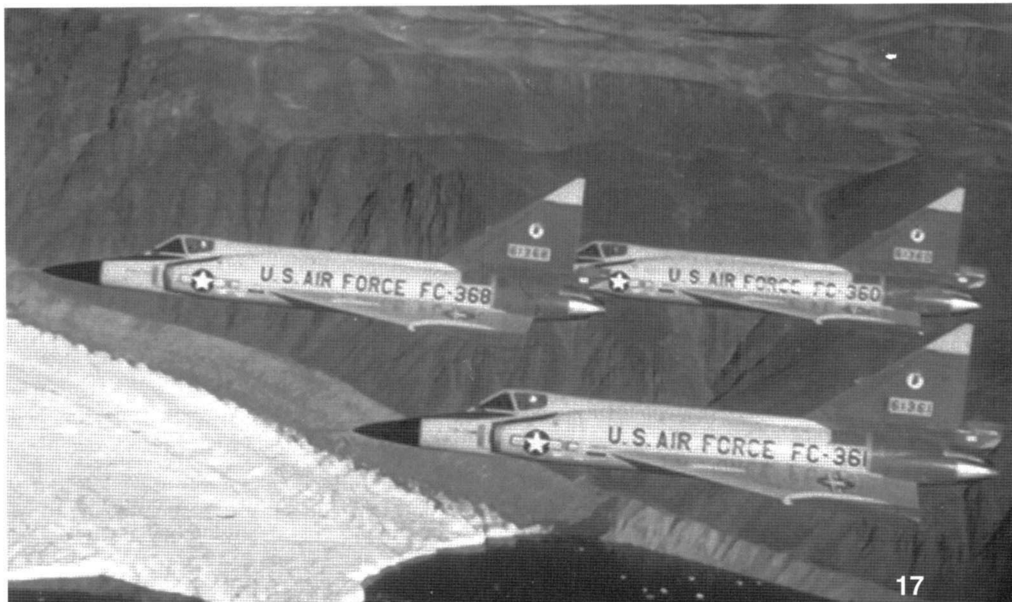
An Air Proving Ground Command F-102A-25 on the ramp at Eglin AFB, Florida in 1956. Two items can be seen: the upsweep of the wingtips typical of a "Case X" wing as used on the early F-102As and the redesigned main landing gear legs that are canted slightly forward to counter landing gear collapses. (Robert F. Dorr)

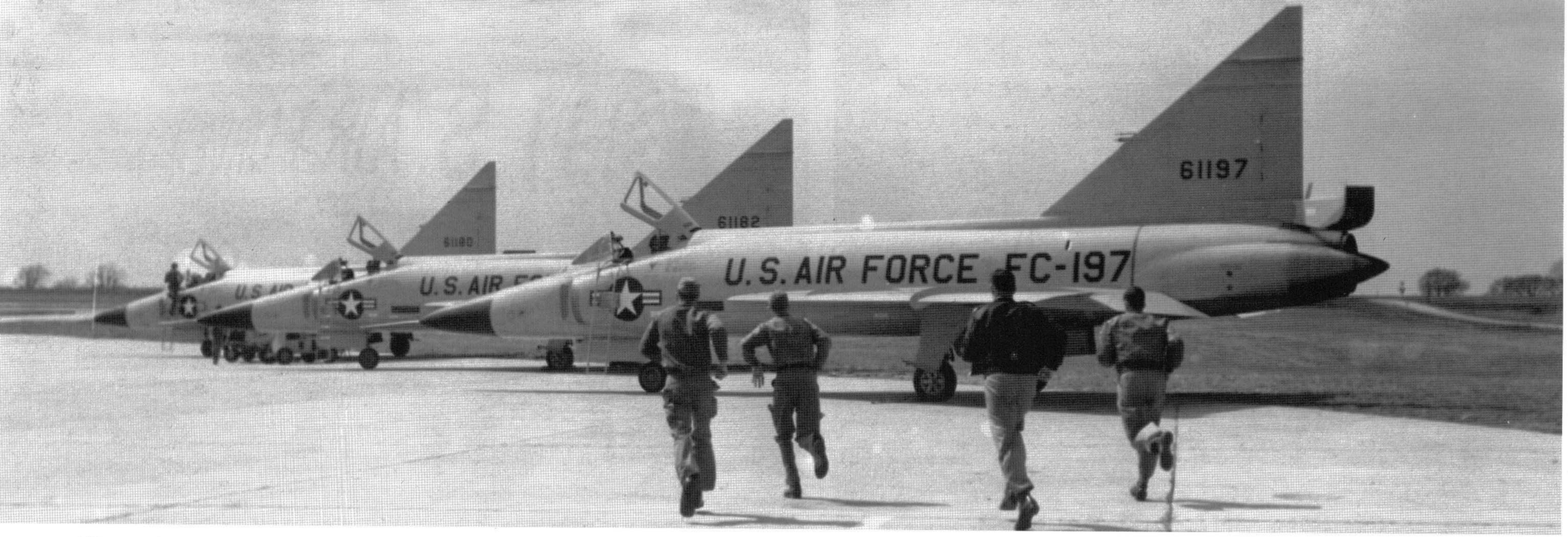




Col. Charles Rigney was commander of the 327th FIS when he set a speed record from George AFB, California, to Oklahoma City in September 1956, making the 1120-mile flight at an average speed of 819.5 mph. The red and white checks on the intakes were part of Col. Rigney's personal markings. (Budd Butcher)

A trio of 327th FIS F-102As over the Wolstenholm Fjord and glacier in August 1958. The 327th FIS deployed to Greenland in June 1958 with ten brand new F-102A-75 aircraft, all having the new "Case XX" wing. The colorful markings seen in 1958 on 327th Delta Daggers were replaced with the typical Red Arctic markings seen here. (Budd Butcher)





Pilots and crew chiefs from the 326th FIS race to their F-102A aircraft during a practice alert "scramble" at Grandview AFB, Missouri, in 1960. By this date, the F-102A was the most numerous interceptor in Air Defense Command, having 25 squadrons equipped with the type. (NORAD)

Operational Service

The F-102A entered operational service on 24 April 1956 when the first production F-102As were delivered to the 327th Fighter Interceptor Squadron at George AFB, California. Air Defense Command wanted the 327th's pilots to demonstrate the capabilities of the new bird as soon as possible. Accordingly, in late summer 1956, 327th FIS commander Col. Charles Rigney made a record flight from George AFB to Oklahoma City, averaging 819.5 mph over the 1120-mile flight. By the end of 1956, 97 F-102As had been delivered to ADC squadrons at bases along the northern border of the United States: the 11th FIS at Duluth Airport, Minnesota, the 31st FIS at Wurtsmith AFB, Michigan, and the 317th FIS at McChord AFB, Washington.

Production was increased dramatically during 1957. Some aircraft were being modified at Ft. Worth, and the first ones went to the 438th FIS at Kinross AFB, Michigan, in July 1957. By the end of 1957, ADC had 428 F-102A/TF-102A aircraft equipping no less than 15 interceptor squadrons at bases from Washington State to upper New York, and as far south as Langley, Virginia.

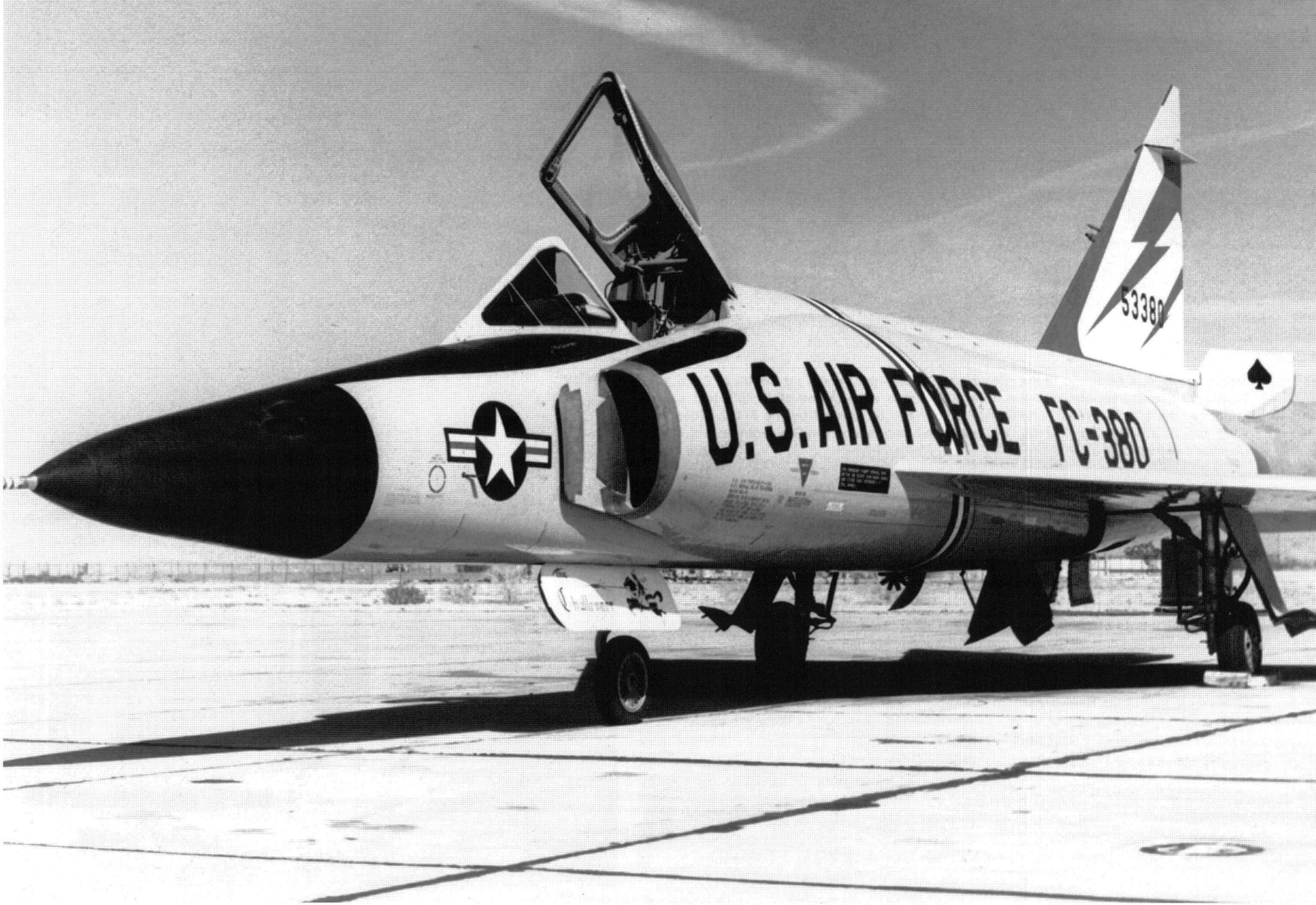
The F-102A first went into operation outside the border of the United States in late summer 1957 when the 317th FIS at McChord AFB, transitioned from F-86Ds to F-102As then moved to Elmendorf AFB, Alaska, commencing operations on 15 August 1957. One month later, the 31st FIS left Wurtsmith and flew their F-102As to Elmendorf. Replacement squadrons were in place at McChord and Wurtsmith before the 317th and 31st deployed to Alaska.

As with every new aircraft put into service, unexpected problems surfaced that had not shown up on the service test aircraft. The electronic equipment was constantly being upgraded as newer systems became available. The main landing gear had a nasty habit of collapsing, leading to a redesign of the oleo strut mechanism and tilting the main gear leg slightly forward a couple of degrees. The speed brakes were found to be inadequate, so Convair designed a larger set of speed brake doors which were retrofitted to all aircraft then in service. Range was greatly increased by 230-gallon dropable underwing fuel tanks which were designed and tested during late 1956. These tanks were needed for the pilots that were taking their aircraft to Alaska, as the F-102A had no inflight refueling capability.

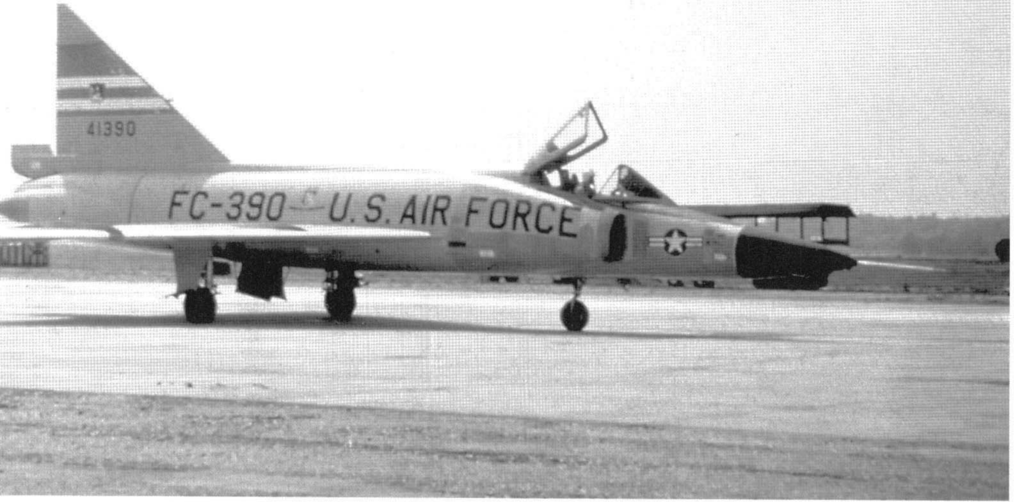
The big delta wing went through a major redesign resulting from flight tests in 1956. The early F-102As and TF-102As had what Convair referred to as the "Case X" wing. The leading edge of the Case X wing was designed with a distinctive downward leading-edge twist or camber. The wing tips, however, were twisted upward. On the top of the wings were four airflow fences. The redesigned "Case XX" wing deleted the upward twist to the wingtip, increased the amount of camber through the entire leading edge including the wing tips, and had a single hardpoint added under each side for the attachment of the 230-gallon underwing tanks. The "Case XX" wing increased the service ceiling by 4,200 feet and upped the top speed by an additional 0.06 Mach at 50,000 feet.

Other changes during production and operations included the addition of an intake splitter plate or ramp to help smooth air flow into the J57 engine. The original intake design caused a distinctive high frequency fuselage "buzz" which the new intake ramp plates eliminated. Pilots also complained that the revised, narrow windscreen had an inordinate amount of glare, so the Convair engineers designed a thin splitter plate that was installed down the inside center of the windscreen. Painted flat black, the splitter plate eliminated the glare. But it did take some time for the pilots to get used to not being able to see through the plate.

(▸▸20)



"The Challenger," an F-102A-45 assigned to the 327th FIS commander at George AFB in 1958. Convair added intake splitter plates to counter a fuselage buzz that was inherent to the early F-102As. The "Ace of Spades" marking on the dive brake doors indicated a flight within the 327th FIS. These colorful markings would disappear when the 327th deployed to Thule, Greenland, in June 1958. (USAF)



This F-102A-30 is assigned to the Armament Development and Test Center at Eglin AFB, Florida. All new weapons and fire control systems were tested at Eglin's test center, including the MG-10 system and AIM-26 Super Falcon carried by the F-102. Nose, and wing bands are DayGlo Orange, while the tail bands are DayGlo Orange and White. (Author's collection)

The fire control system was upgraded with the addition of a data link that gave the pilot instantaneous updates from the Ground Control Intercept (GCI) controller. The Hughes MG-10 FCS also incorporated this data link. Although it did not give the same exact capability as the Semi-Automatic Ground Environment (SAGE) system employed by F-86L Sabre interceptors, it was a very close second.

Under Project BIG EIGHT, the armament was upgraded by replacing the 2.0-in. FFAR rockets with standard 2.75-in. FFARs, and an infrared scanner was added with a distinctive seeker "ball" installed just in front of the windscreen. This allowed use of the AIM-4C Falcon, which had an infrared seeker head. Normal operational armament thereafter became three AIM-4A/B radar-guided Falcons and three AIM-4C/D/G infrared Falcons.

In 1963 the F-102A received a nuclear capability with installation of a launch kit that allowed carriage of the Hughes AIM-26A/B Super Falcon air-to-air missile. The AIM-26 could have either a conventional warhead or a nuclear warhead with a 1.5-kiloton yield. The use of AIM-26 nuclear missiles would only be allowed when defending against a confirmed mass bomber attack on the United States. Six squadrons — three ADC and three Air National Guard squadrons — received the AIM-26 nuclear capability. Installation of the AIM-26 kit to fire either conventional or nuclear weapons caused deletion of the FFAR option.

In June 1958, the F-102A was deployed outside of North America for the first time, when the 327th FIS, the first operational F-102 squadron, took 10 of their F-102As and two TF-102As from George AFB, California, to Thule AB, Greenland. Some of the 327th's aircraft had the AN/ARN-21 TACAN navigational aid installed when the deployment took place. However, even though the aircraft had TACAN receivers, there were few TACAN transmitters along the route to Thule. To their dismay, the F-102A pilots had to be escorted by F-89s all the way to Goose Bay, Labrador.

By the end of 1958, the Air Force had 651 F/TF-102As on the inventory, most of them

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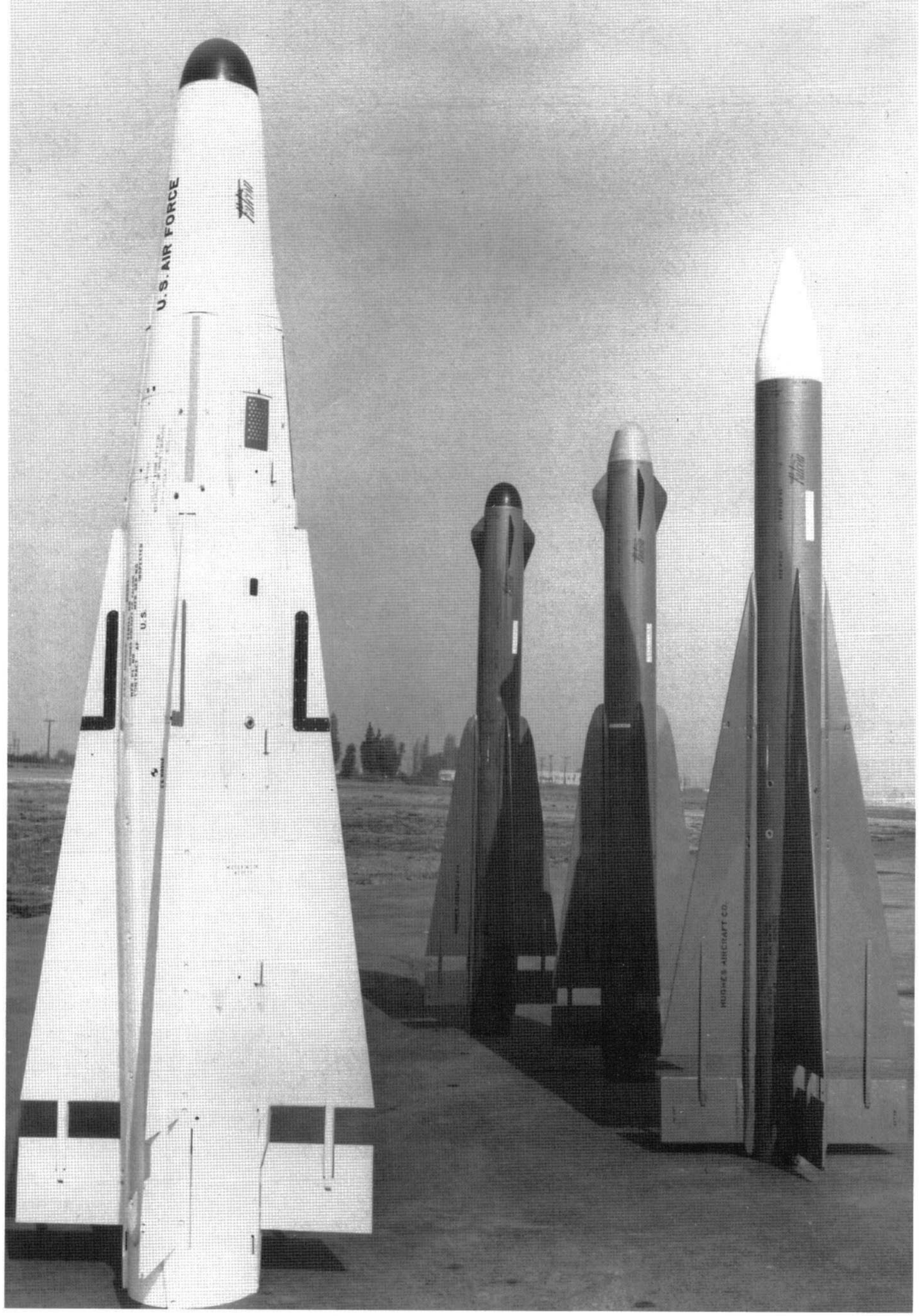
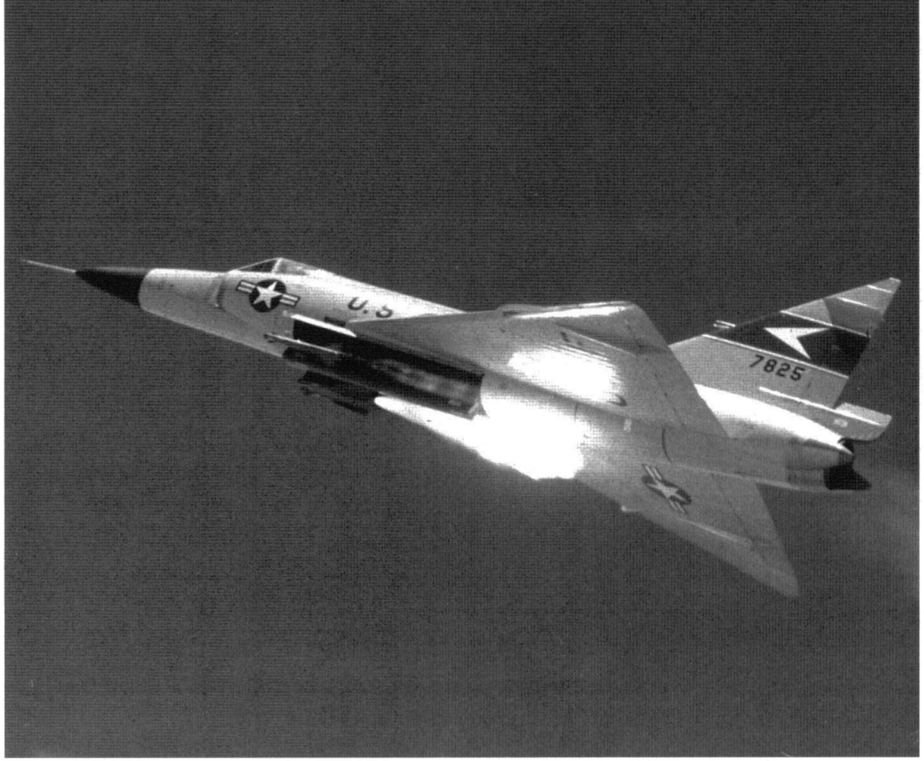
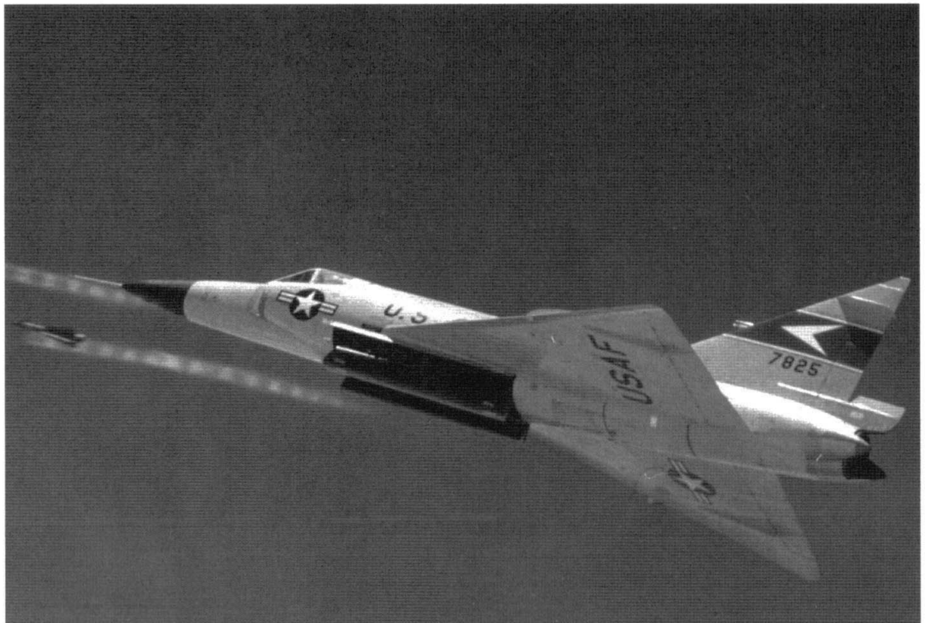


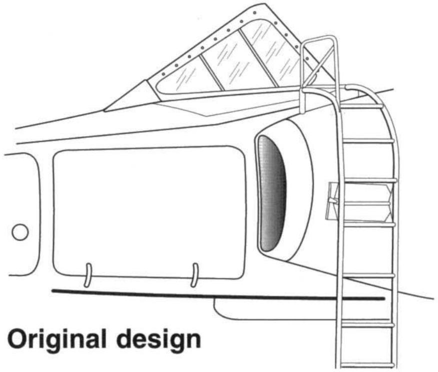
The family of Hughes Falcon missiles. The white missile is the Hughes AIM-26 Super Falcon, which could have either a conventional or nuclear warhead with a 1.5 kiloton yield. Other missiles are AIM-4 Falcons with various seeker heads installed, including radar guided and infra-red homing. (Hughes)



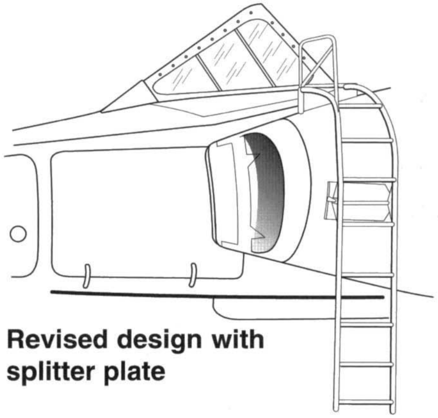
(Above and Below) An F-102A from the 329th FIS fires a volley of AIM-4A radar homing missiles at a target drone over the California high desert range. Normal armament for combat operational F-102As was three AIM-4A radar homing missiles in the forward missile bay, and three AIM-4C infrared heat seeking missiles in the aft missile bay. (Convair)



Intakes

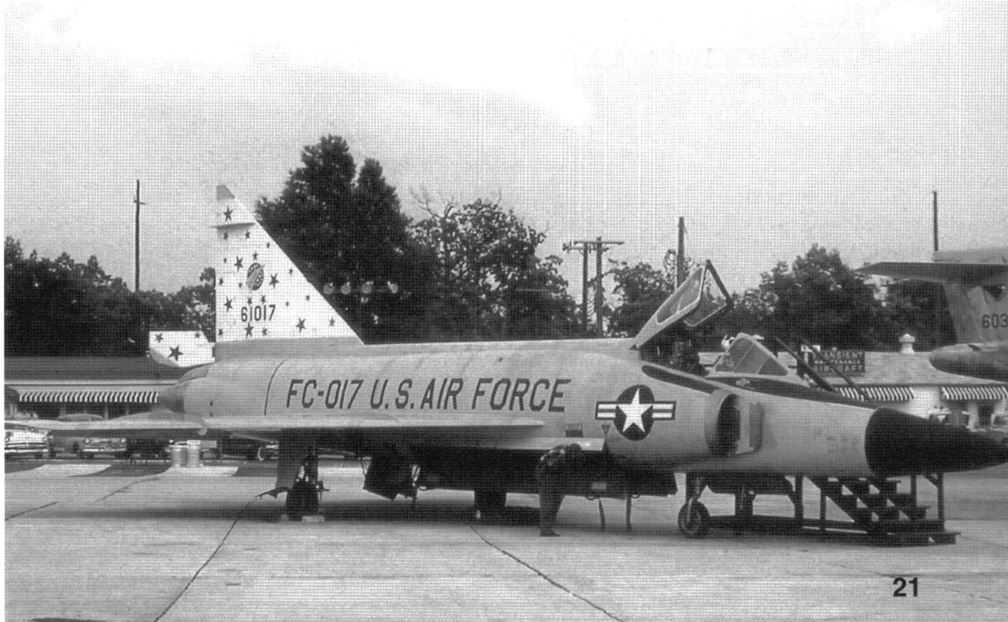


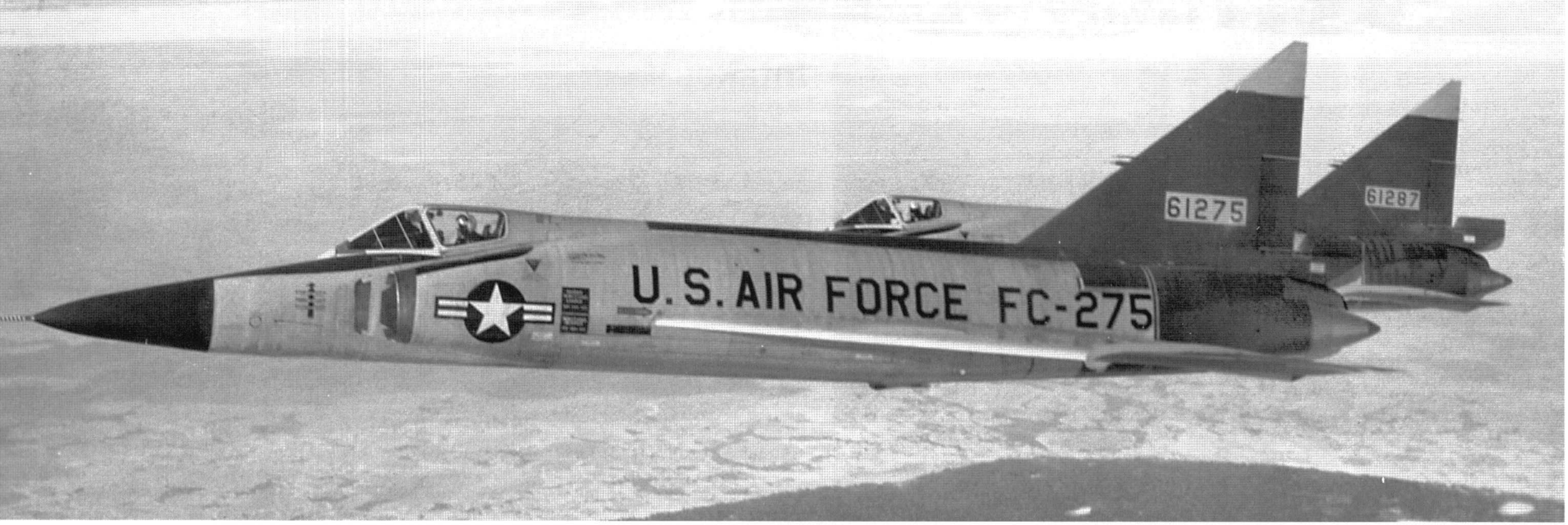
Original design



Revised design with splitter plate

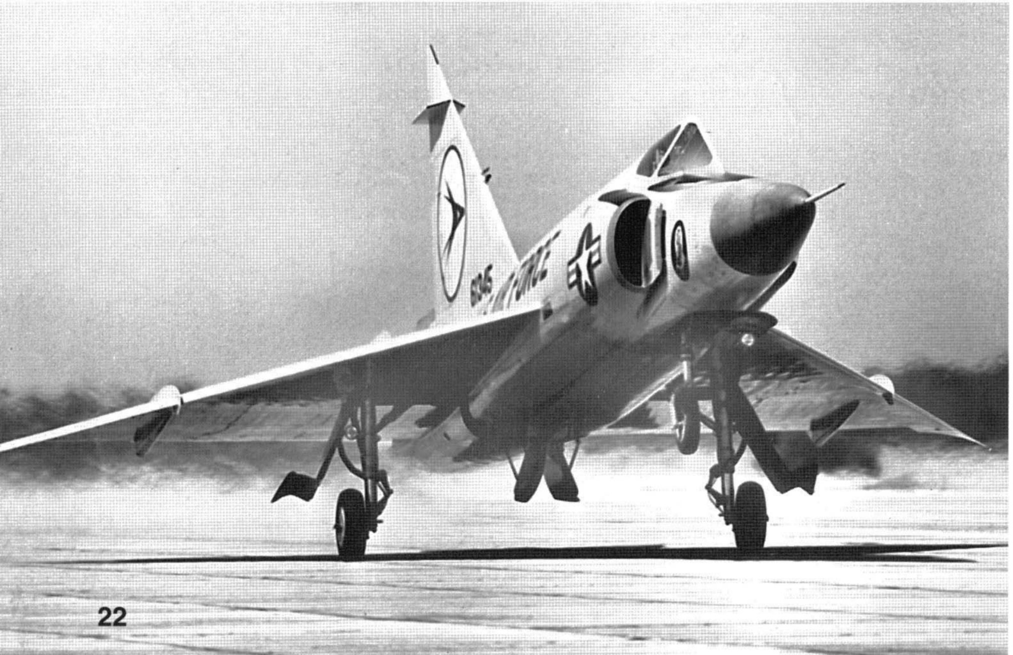
(Below) A 48th FIS F-102A-55 on the ramp at Langley AFB, Virginia, in May 1960. The 48th FIS guarded both Tactical Air Command Headquarters at Langley and U.S. Navy installations in the Norfolk, Virginia, area. The gloss Aircraft Grey (FS 16473) paint shows signs of weathering. The tail is white with blue stars. (Ron Picciani Collection)



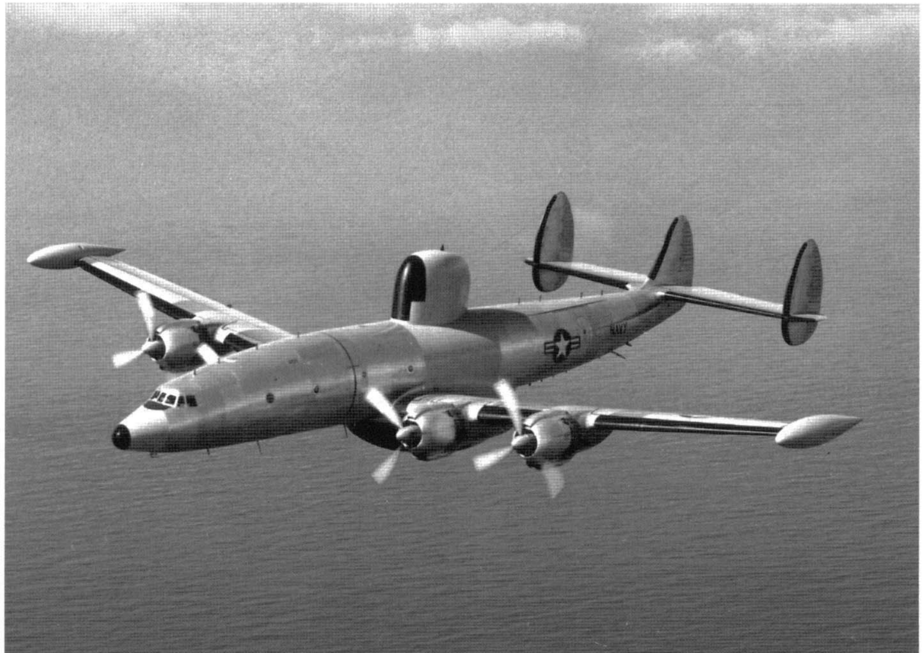


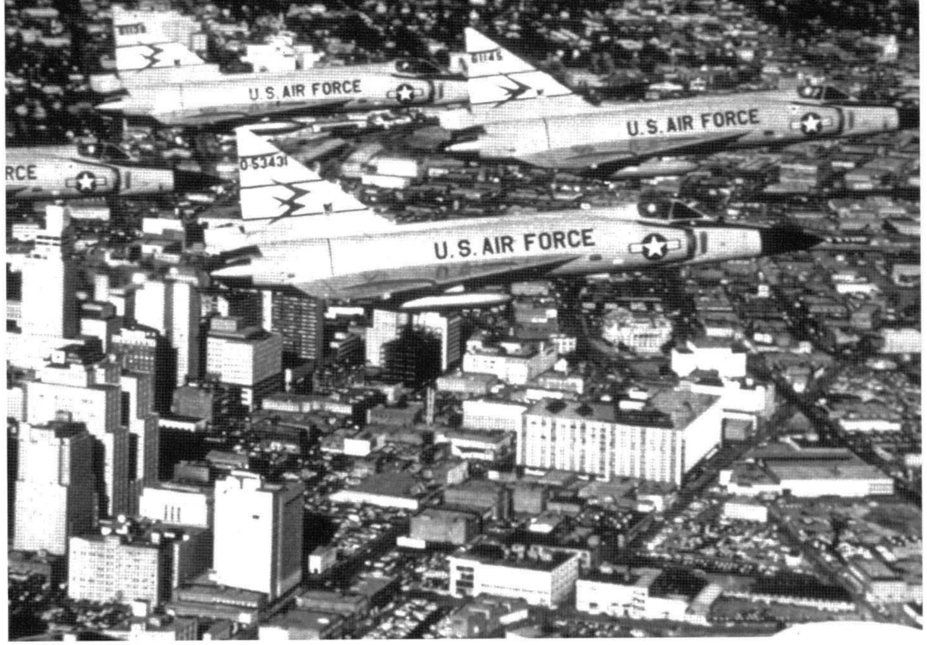
A pair of F-102A-75s from the 317th FIS over the frozen tundra of Alaska during the early 1960s. The 317th was the first F-102 squadron to deploy outside the borders of the United States when on 15 August 1957 it moved from McChord AFB, Washington, to Elmendorf AFB, Alaska, where it was assigned to Alaska Air Command. (USAF)

A 318th FIS F-102A-75 in full afterburner scrambles from McChord AFB, Washington, in summer 1958. In afterburner the Pratt & Whitney J57-P-23 engine could produce over 16,000 pounds of thrust. The 318th FIS took over the mission at McChord when the 317th FIS was transferred to Alaska. (USAF)



During the 1950s and 1960s, Air Defense Command Lockheed RC-121D airborne early warning aircraft, patrolling far out to sea over the Atlantic and Pacific oceans, vectored the F-102A interceptors to the target area. (USAF)

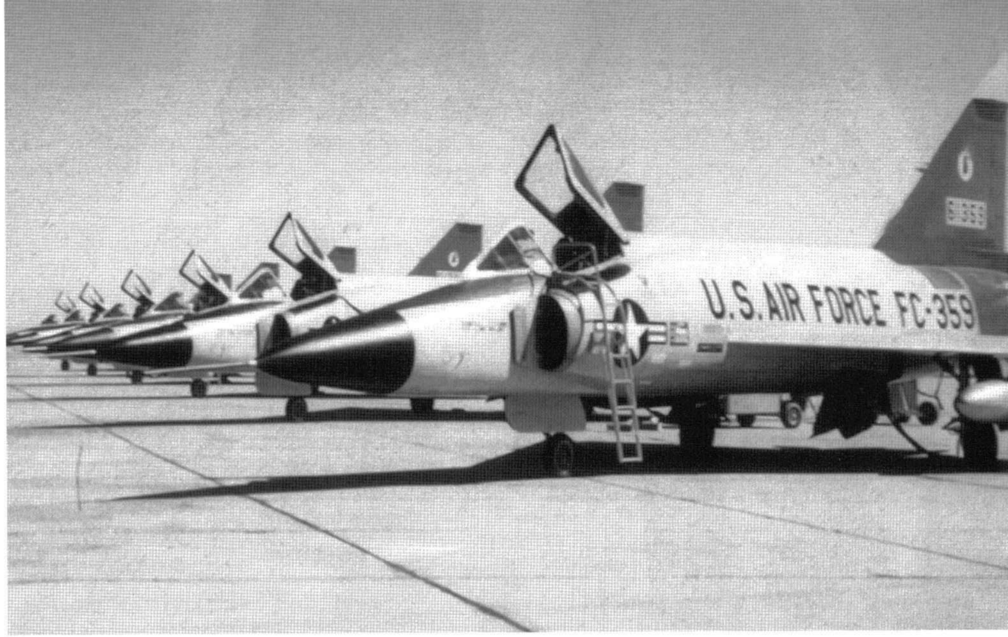




A flight of F-102A Delta Daggers over downtown San Antonio in 1965. The 4780th ADW was the primary interceptor school and was located at Perrin AFB, Texas. (Author's collection)

Major Budd Butcher stands by his new F-102A-75 prior to the deployment of the 327th FIS to Thule, Greenland, in June 1958. The very sharply angled windscreen and engine intake ramps are all modifications performed during production. The intake ramps eliminated an annoying fuselage "buzz" that pilots complained about. (Budd Butcher)

ILOT MAJ. B.H.BUTCHER
C T SGT P.R.CANALES



The 327th FIS on the ramp at George AFB immediately prior to deployment to Thule AB, Greenland, in June 1958. For the deployment, all aircraft — 10 F-102As and two TF-102As — had Insignia Red (FS 11136) paint applied to fuselages and wings for high visibility in the snow-covered regions of Greenland. (Budd Butcher)

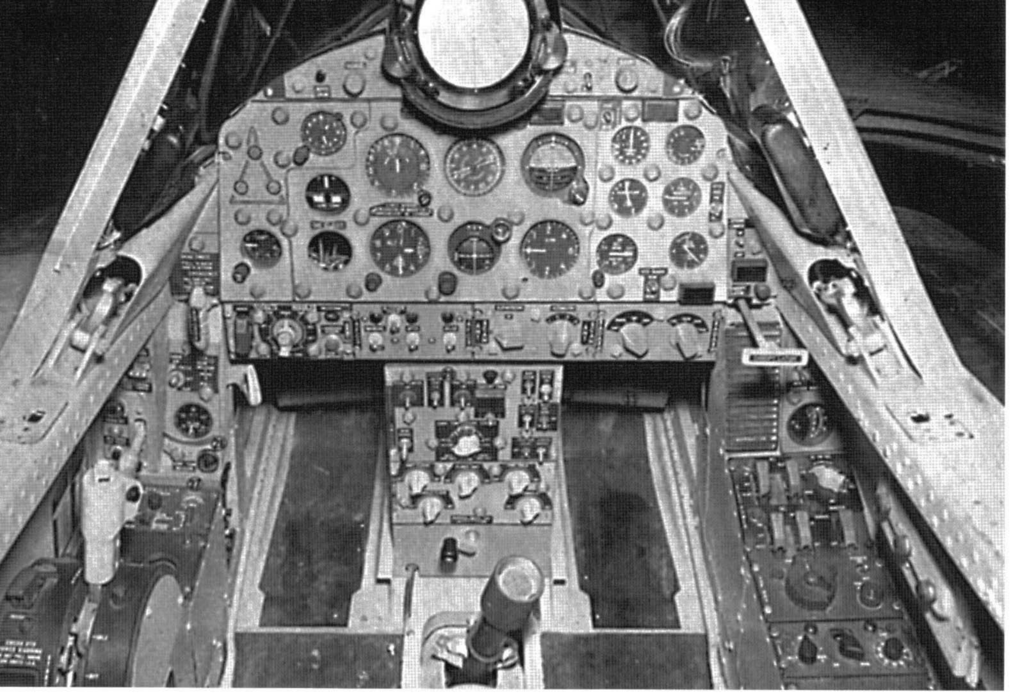
in Air Defense Command. However, it was at that time that ADC was beginning to transition into the follow-on aircraft, the F-106A Delta Dart.

By the end of 1959, the number of F-102As in ADC was down over 150 aircraft, due in part to crashes and writeoffs, but mostly due to transfers to bases and squadrons outside ADC's control. On 3 January 1959, United States Air Forces Europe (USAFE) received its first F-102As when the 525th FIS at Bitburg AB, Germany, exchanged their F-86Ds for F-102As. Two months later, on 9 March 1959, the first F-102s became operational in the Far East, when the 16th FIS transitioned to F-102As at Naha AB, Okinawa. Seven squadrons in Pacific Air Forces (PACAF) flew the F-102A between March 1959 and June 1971, including two squadrons that flew combat during the Vietnam War.

Three years before the Gulf of Tonkin incident drew the United States into the war in Vietnam, PACAF deployed F-102As to Thailand. In April 1961, PACAF initiated Operation BELL TONE, sending four F-102A aircraft from Clark AB, Philippines, to Don Muang Airport, Bangkok, Thailand, to bolster Thai air defenses against a possible communist threat from North Vietnam.

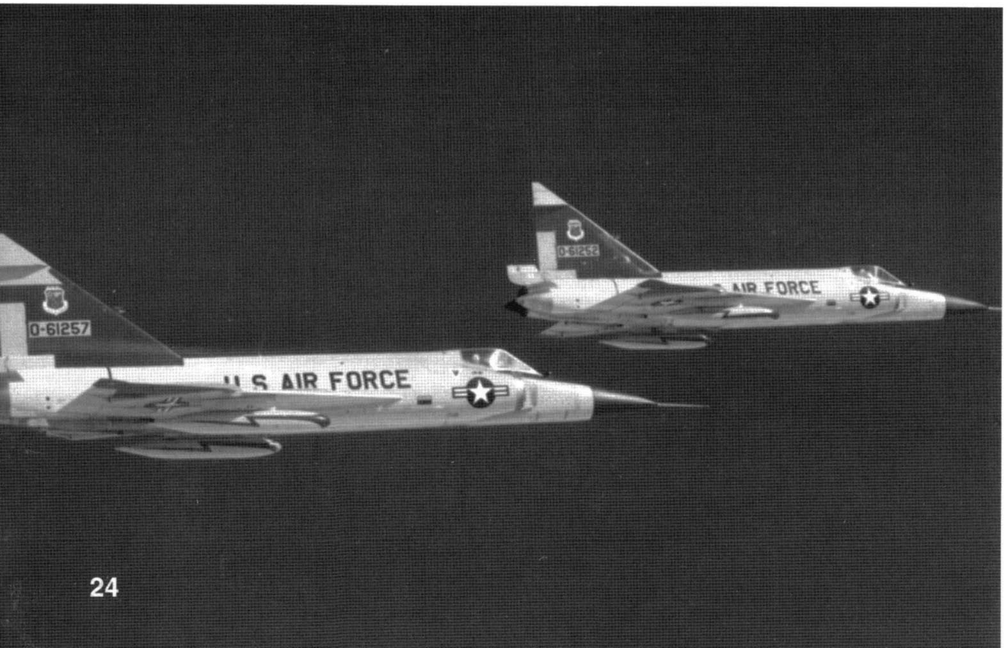
In late March 1962, U.S. radars detected several aircraft flying along the Vietnam-Cambodian border. Thinking that these could be North Vietnamese IL-28 'Beagle' jet bombers. PACAF headquarters ordered Operation WATERGLASS, which sent three 509th FIS F-102As and a single TF-102A to Tan Son Nhut AB, South Vietnam. In November 1963, WATERGLASS was replaced with Operation CANDY MACHINE, which ordered a regular deployment of F-102As to bases in South Vietnam and Thailand. Aircraft from the 64th FIS rotated to bases in South Vietnam at DaNang and Tan Son Nhut, while aircraft from the 509th went to bases in Thailand including Udorn and Don Muang Airport near Bangkok.

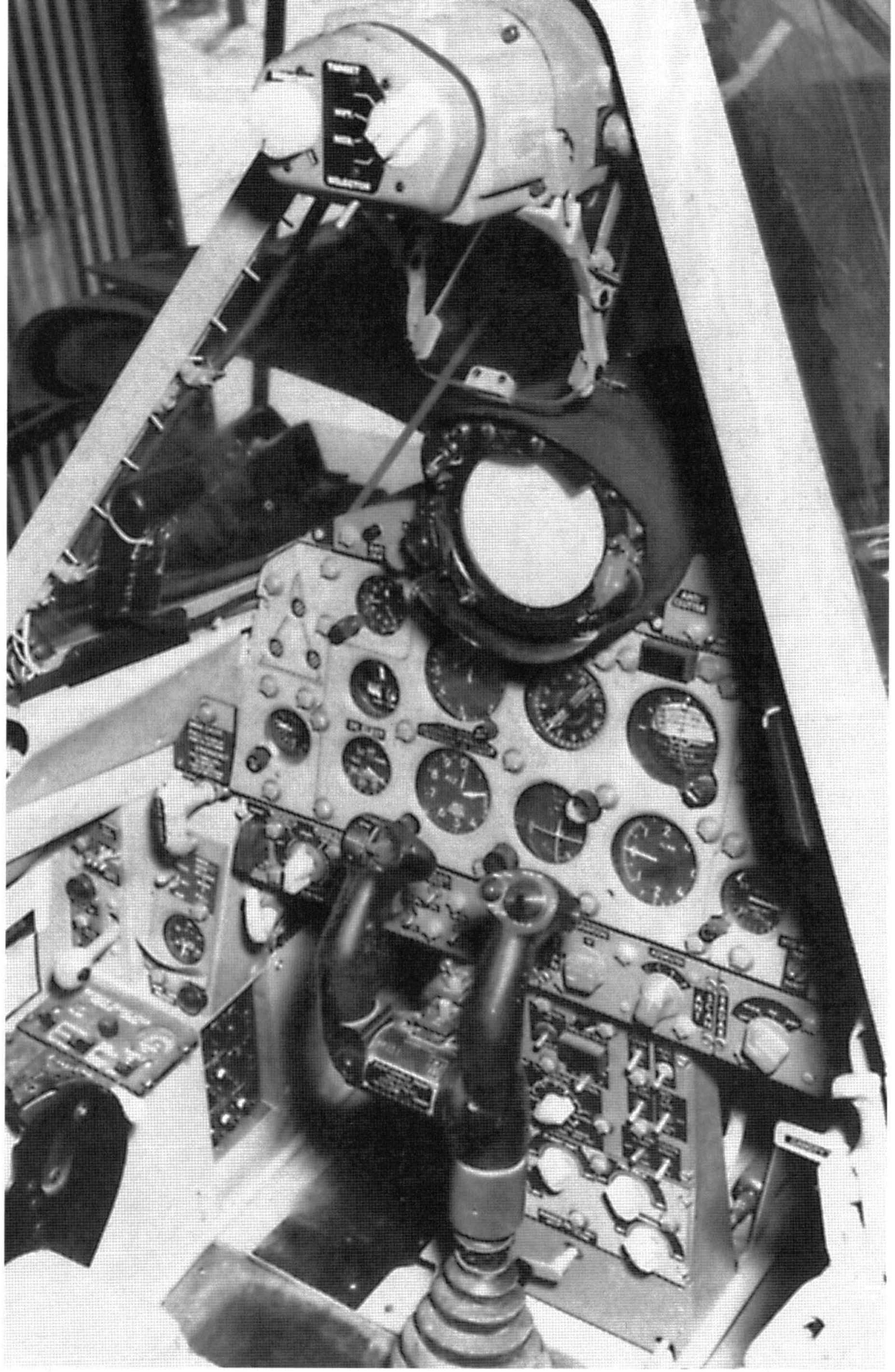
(▸▸ 29)



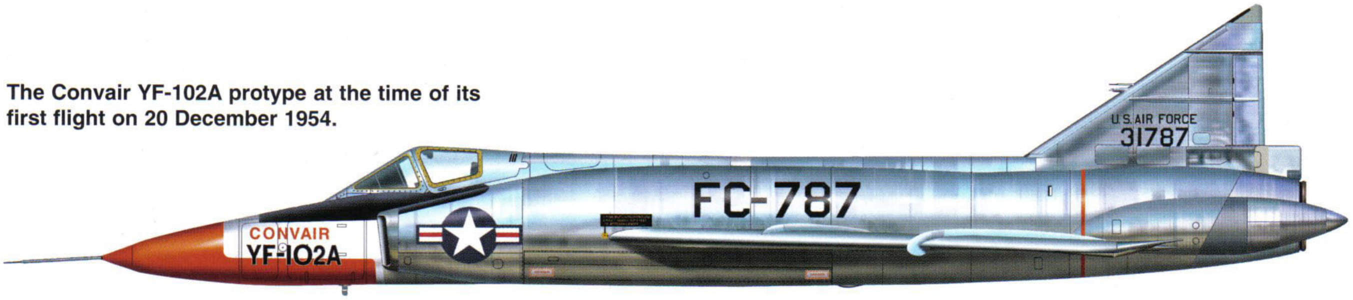
(Above and Right) Cockpit of the F-102A Delta Dagger. The cockpit was painted Light Grey (FS 36473) with Black consoles. (USAF)

A pair of 317th FIS F-102As flying a patrol over the Bering Sea during the late 1960s. With the underwing tanks, the range of the F-102A was about 1,500 miles. The "0" at the beginning of the tail number, 0-61257, means the aircraft has been in service over ten years. (USAF)

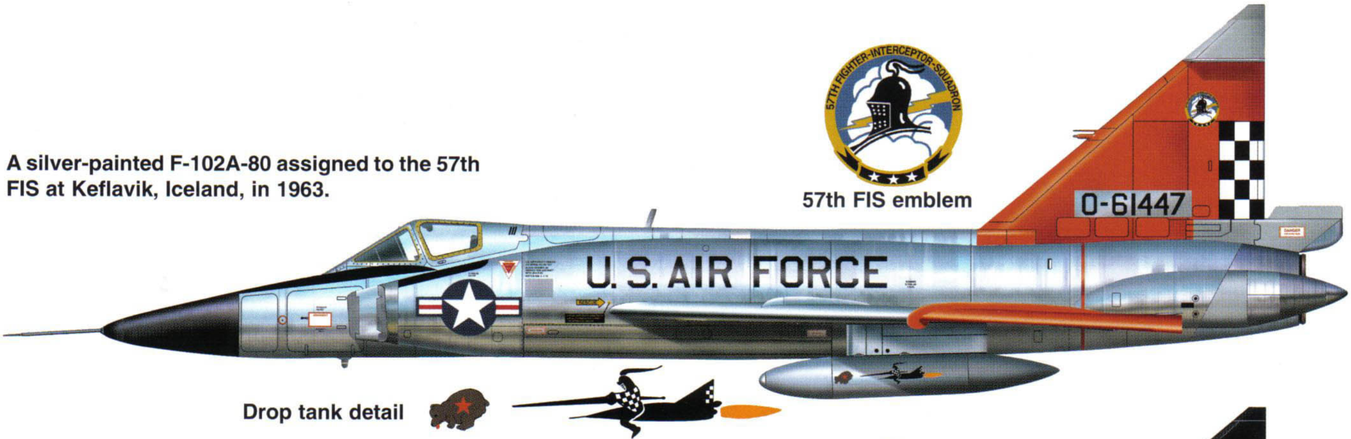




The Convair YF-102A protype at the time of its first flight on 20 December 1954.


U.S. AIR FORCE
31787
FC-787
CONVAIR
YF-102A

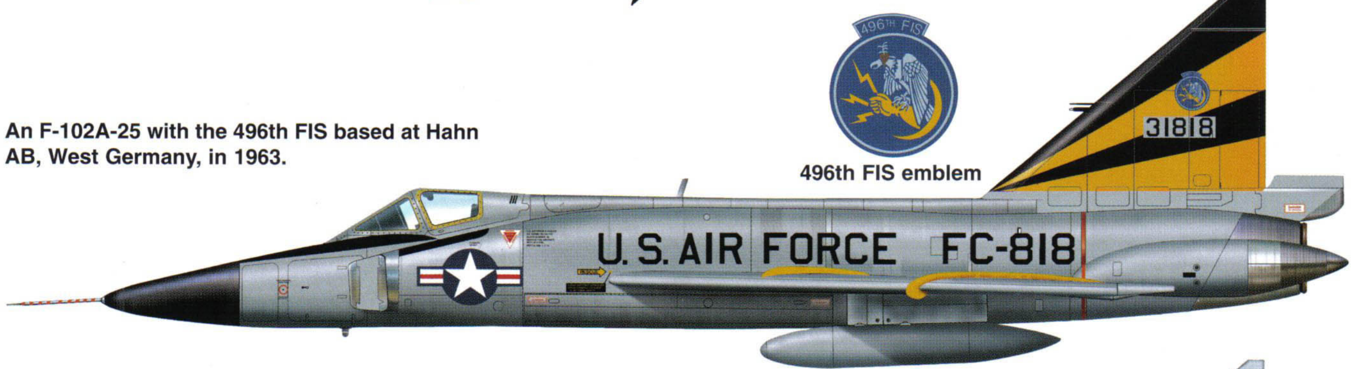
A silver-painted F-102A-80 assigned to the 57th FIS at Keflavik, Iceland, in 1963.


57TH FIGHTER-INTERCEPTOR-SQUADRON
0-61447
U.S. AIR FORCE

57th FIS emblem

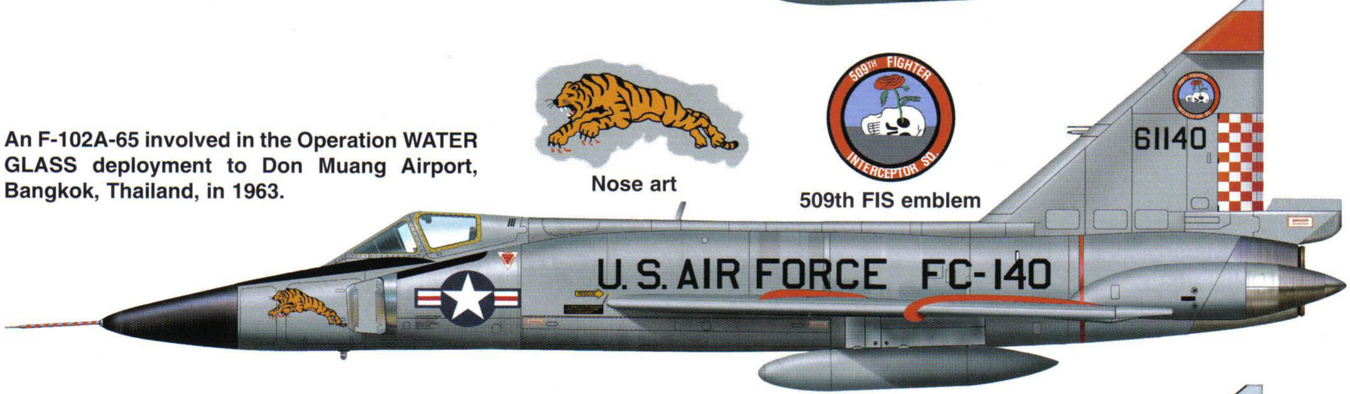
Drop tank detail

An F-102A-25 with the 496th FIS based at Hahn AB, West Germany, in 1963.


496TH FIS
31818
U.S. AIR FORCE FC-818

496th FIS emblem

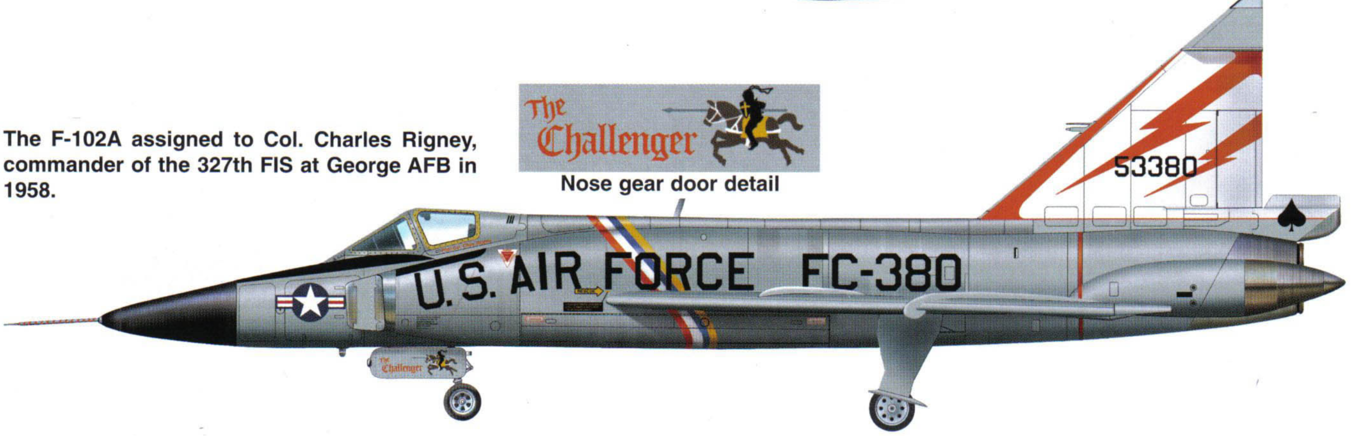
An F-102A-65 involved in the Operation WATER GLASS deployment to Don Muang Airport, Bangkok, Thailand, in 1963.


509TH FIGHTER
INTERCEPTOR SQ.
61140
U.S. AIR FORCE FC-140

Nose art

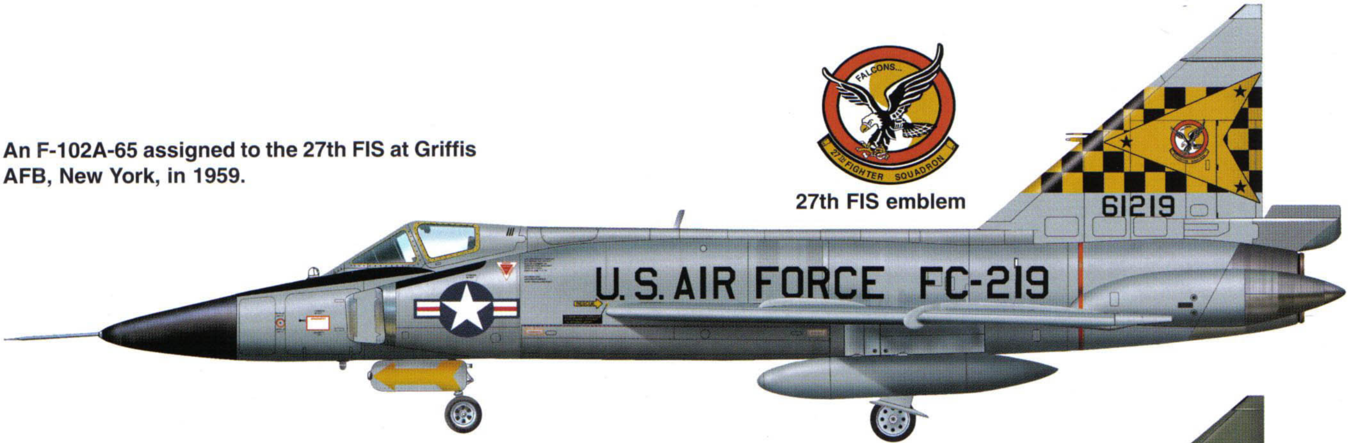
509th FIS emblem

The F-102A assigned to Col. Charles Rigney, commander of the 327th FIS at George AFB in 1958.


The Challenger
53380
U.S. AIR FORCE FC-380

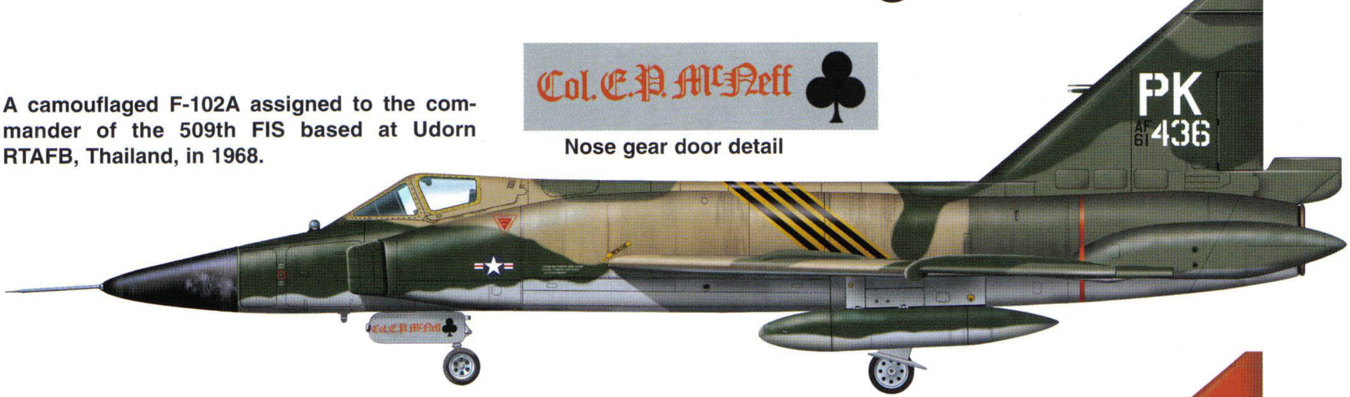
Nose gear door detail

An F-102A-65 assigned to the 27th FIS at Griffis AFB, New York, in 1959.


FALCONS...
27th FIGHTER SQUADRON
61219
U.S. AIR FORCE FC-219

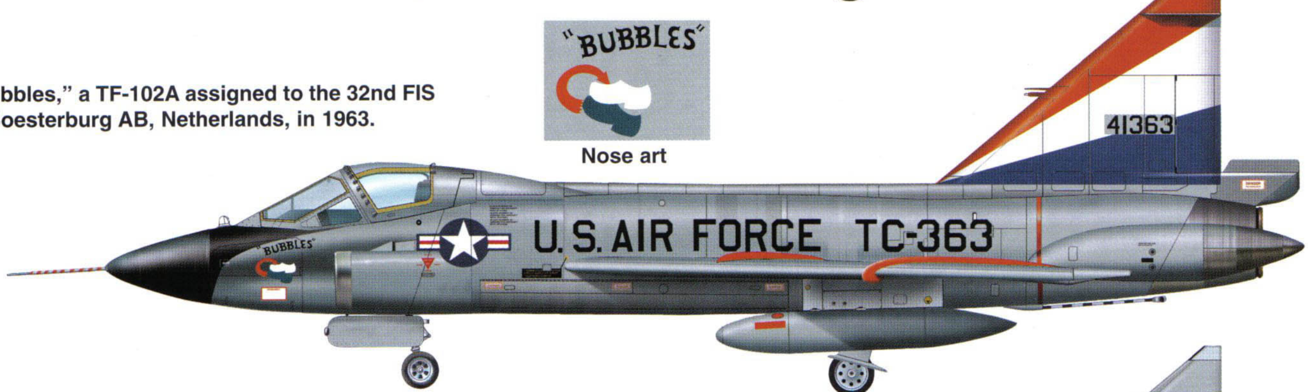
27th FIS emblem

A camouflaged F-102A assigned to the commander of the 509th FIS based at Udorn RTAFB, Thailand, in 1968.


Col. E.P. McNeff
PK
AF 61 436

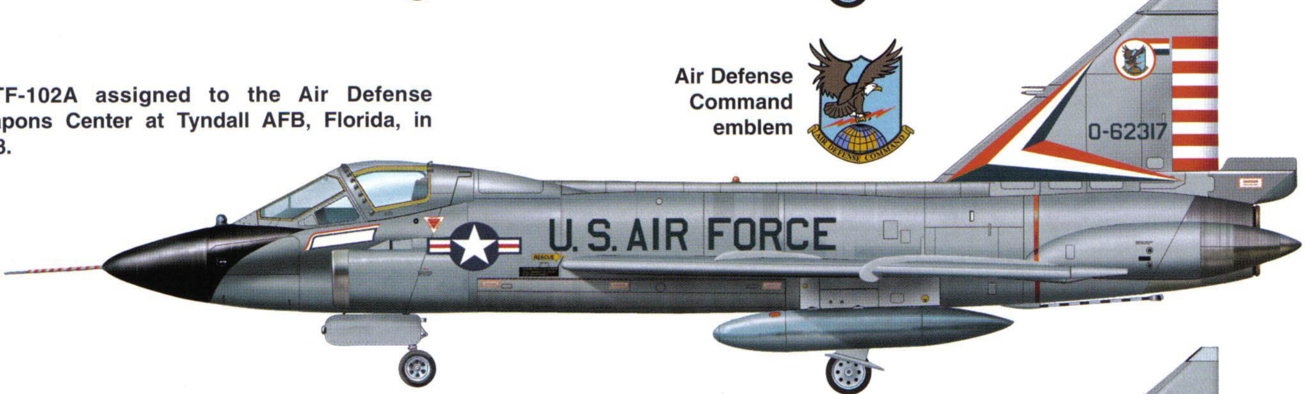
Nose gear door detail

"Bubbles," a TF-102A assigned to the 32nd FIS at Soesterburg AB, Netherlands, in 1963.


"BUBBLES"
41363
U.S. AIR FORCE TC-363

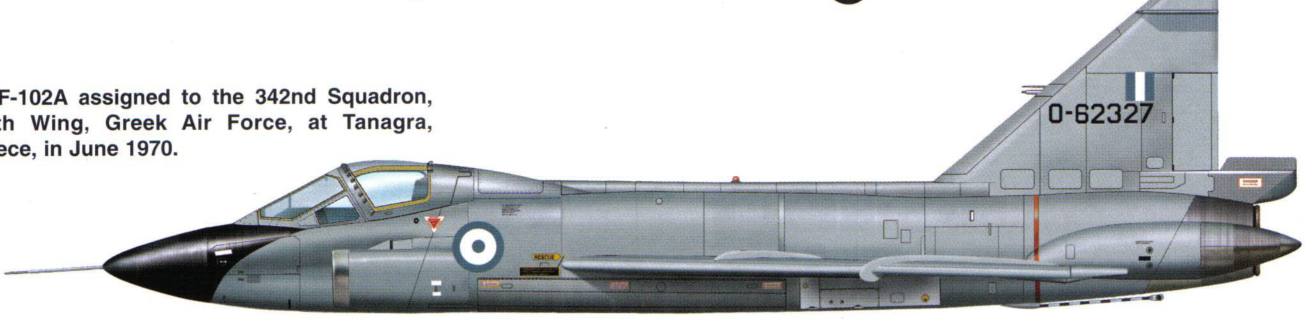
Nose art

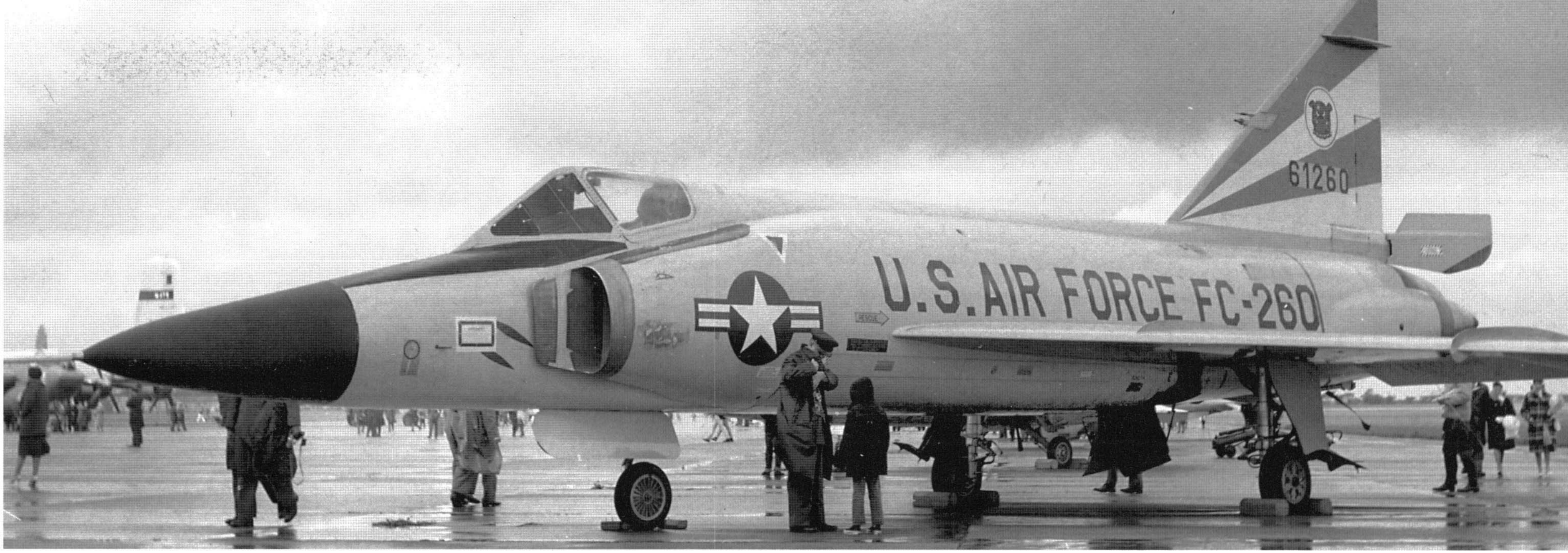
A TF-102A assigned to the Air Defense Weapons Center at Tyndall AFB, Florida, in 1968.


AIR DEFENSE COMMAND
0-62317
U.S. AIR FORCE

Air Defense Command emblem

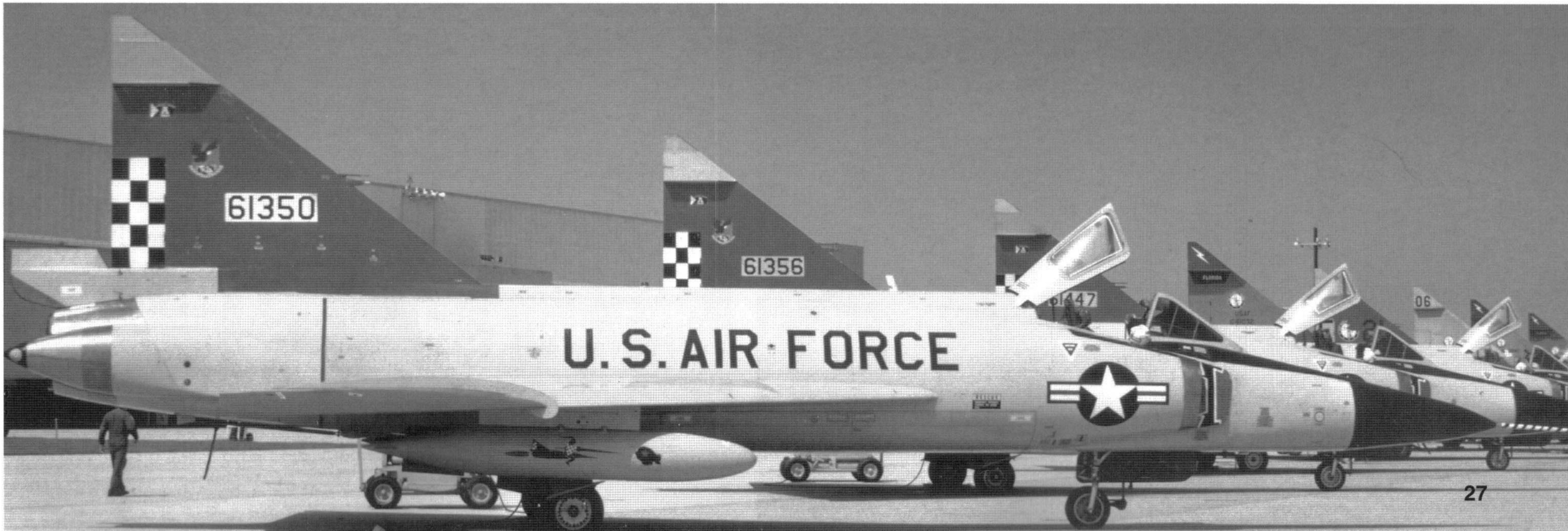
A TF-102A assigned to the 342nd Squadron, 114th Wing, Greek Air Force, at Tanagra, Greece, in June 1970.

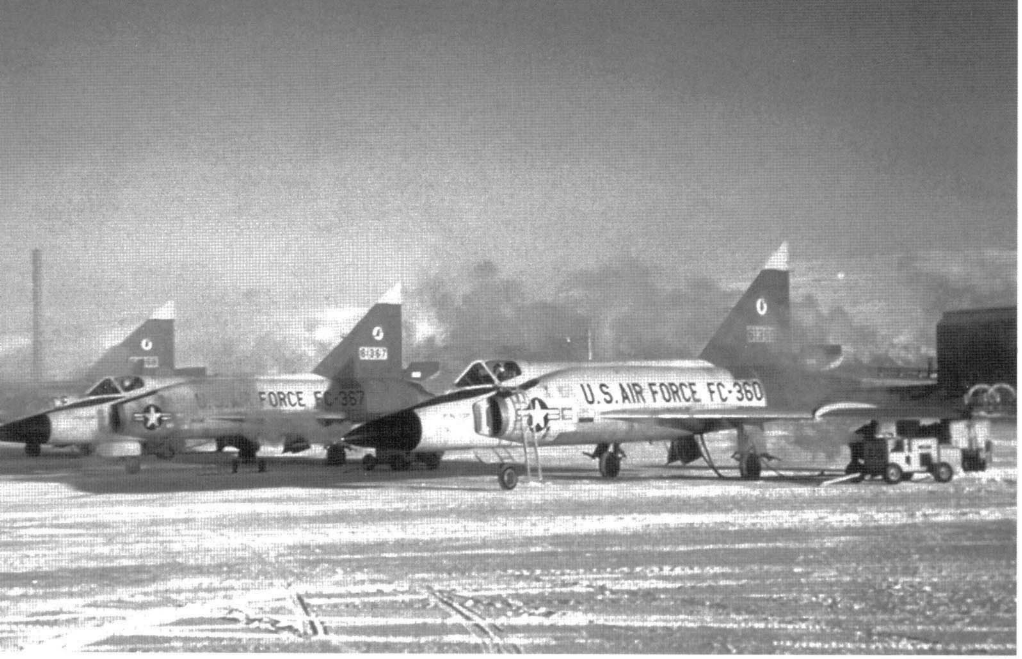




An F-102A from the 525th FIS on the ramp at Bitburg AB, West Germany, during a cold open house in May 1960. The first USAFE unit to operate the F-102A, the 525th FIS transitioned from F-86Ds to F-102As in January 1959. (Joe Bruch)

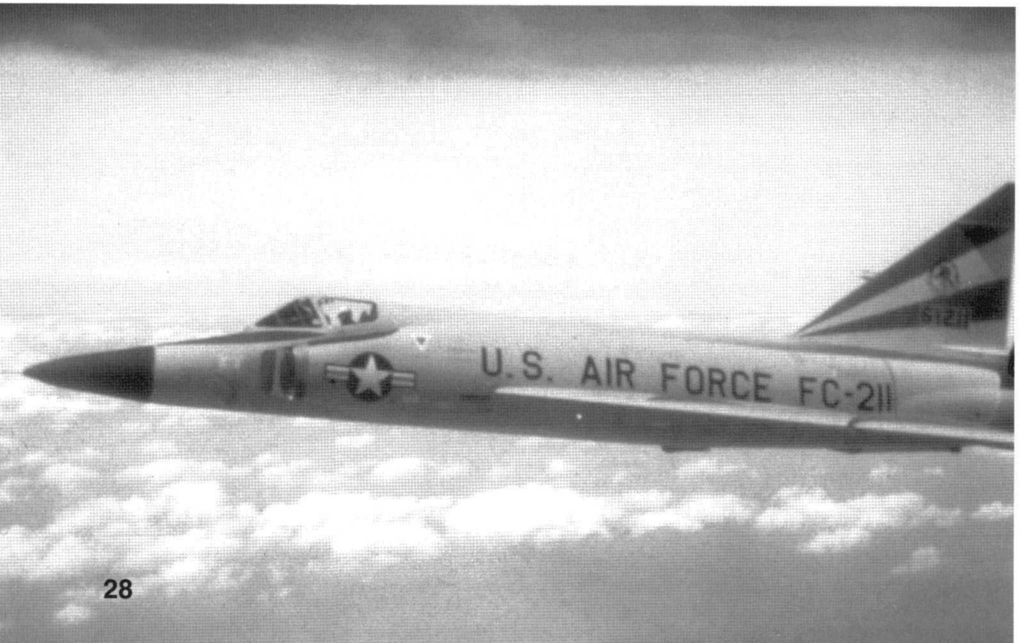
F-102A-75s of the 57th FIS based at Keflavik, Iceland, share the ramp at Jacksonville with Florida Air National Guard F-102s during the William Tell competition in 1968. The William Tell Missile Meet brought various squadrons and aircraft types together for a 'shoot-off' against real targets over the Gulf of Mexico. (Stephen Miller)

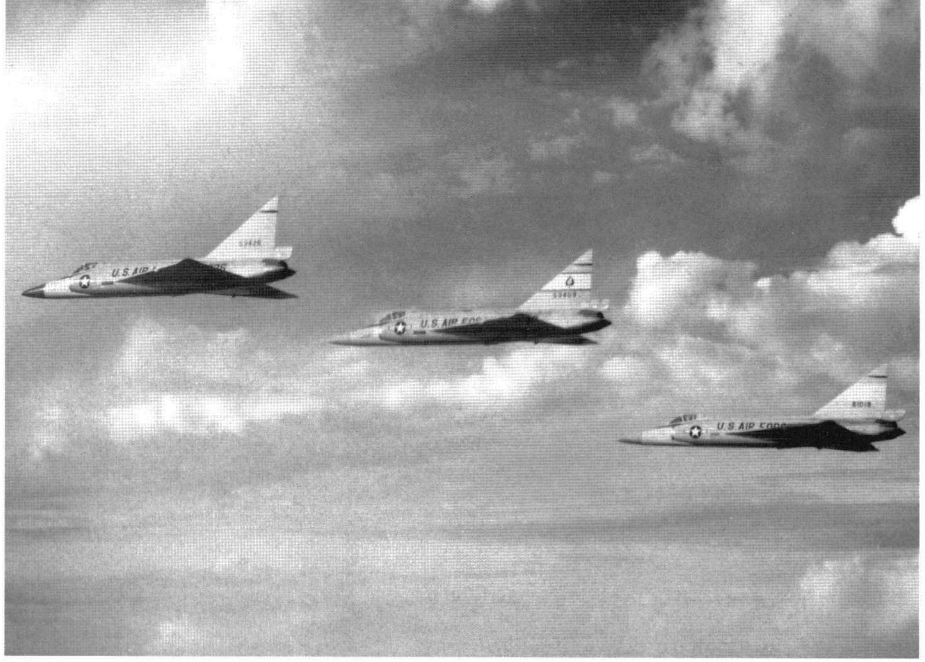




Thule AB, Greenland, during the winter of 1959. The ramps and runways were snow-covered, and the temperature was 35 degrees below zero! Pilots sat in the cockpits while crew chiefs pumped warm air into the J57 engines when the airplanes and crews were on 5-minute alert status. (Budd Butcher)

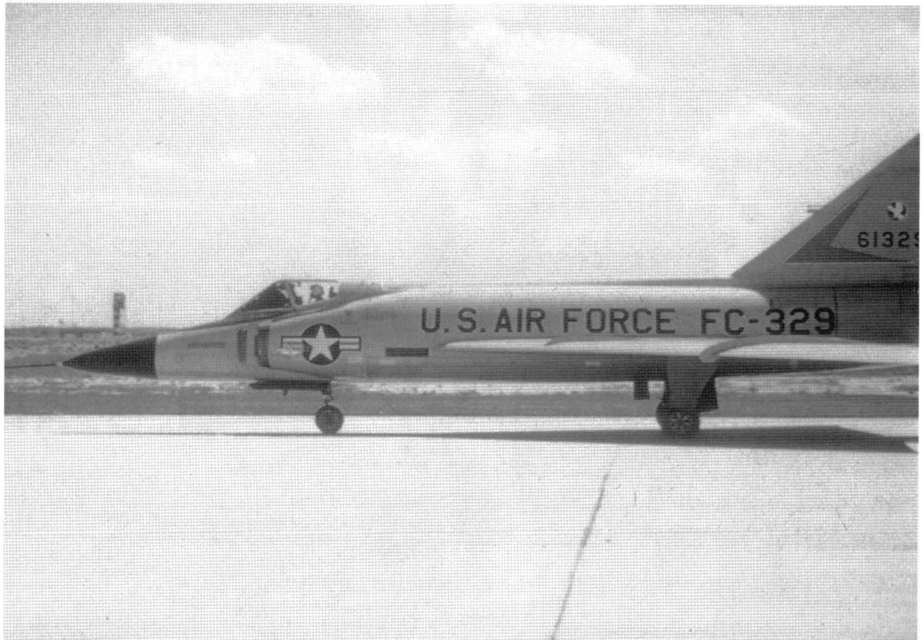
In early 1959, air defense units in United States Air Forces Europe began receiving the F-102A. This F-102A-65 is from the 526th FIS based at Ramstein AB, West Germany. The 526th FIS transitioned from F-86Ds into F-102As in June 1960. (Col. Wm. Lewis)

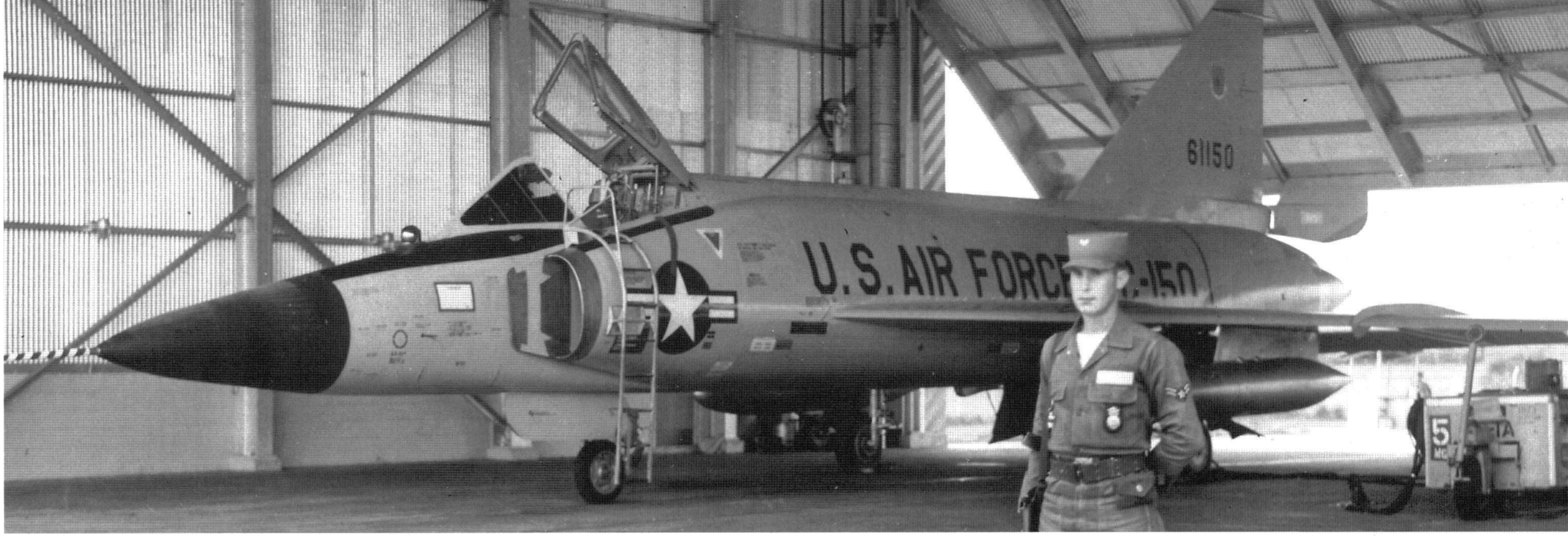




A trio of 47th FIS F-102As in 1959. The 47th FIS was based at Niagara Falls Airport and converted to the F-102A in June 1958. (USAF)

A 332nd FIS F-102A-70 taxies to the active runway at McGuire AFB, New Jersey, in 1959. The 332nd would operate the F-102A from 1957 to 1965 and would take the "Deuce" to two other bases, England AFB, Louisiana, and Thule, Greenland. (Ron Picciani)





An armed Air Policeman guarding a F-102A-65 from the 509th FIS in the alert barn at Clark AB, Philippines, casts a wary eye at the photographer in 1961. The Delta Daggers of the 509th FIS were the first aircraft to deploy to Tan Son Nhut AB, South Vietnam, during Operation BELL TONE in April 1961. (USAF)

Although most of the F-102A missions during the Vietnam War were for base defense, in some instances F-102As were used as ground attack aircraft. F-102As were credited with the destruction of over 100 buildings, 16 sampans, and even a bridge! Many were destroyed using the 2.75-in. FFARs, although at least one aircraft was modified with a SUU-11/11A Minigun pod, the same gun used by Air Force A-1 Skyraiders.

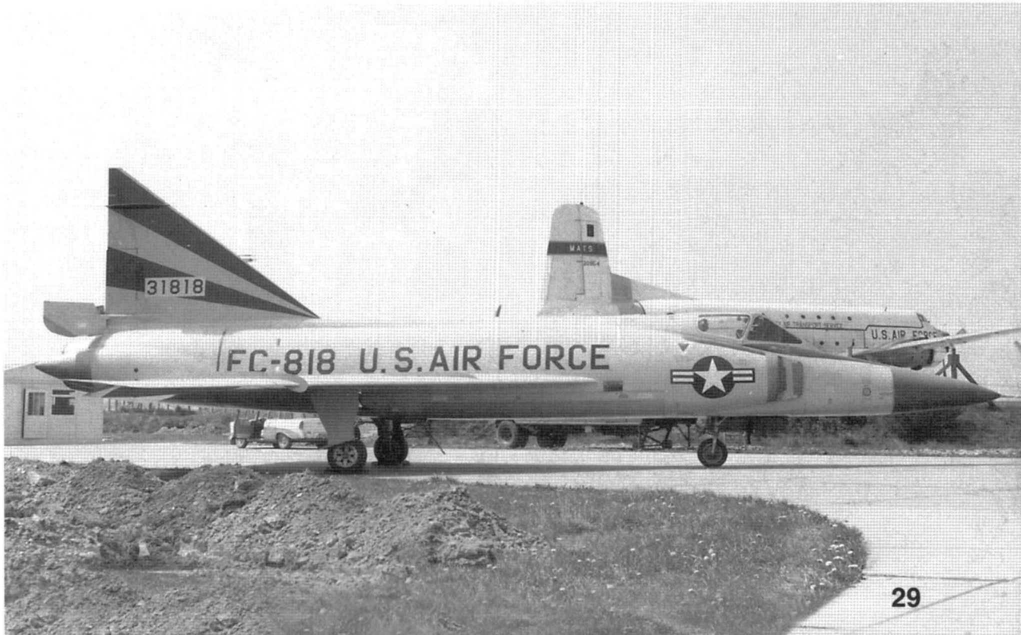
F-102As from the 509th FIS were used for escort of ARC LIGHT B-52s and surveillance aircraft operating near the North Vietnam border. One such mission cost the life of a pilot from the 509th. On 3 February 1968 a pair of 509th F-102As launched from Udorn RTAFB to escort some jamming aircraft that were operating over Laos near the North Vietnam border. As the F-102A normally would not penetrate North Vietnamese air space, the aircraft were not equipped with any radar homing and warning equipment to warn them of an impending threat, whether aircraft, anti-aircraft artillery, or surface-to-air missiles.

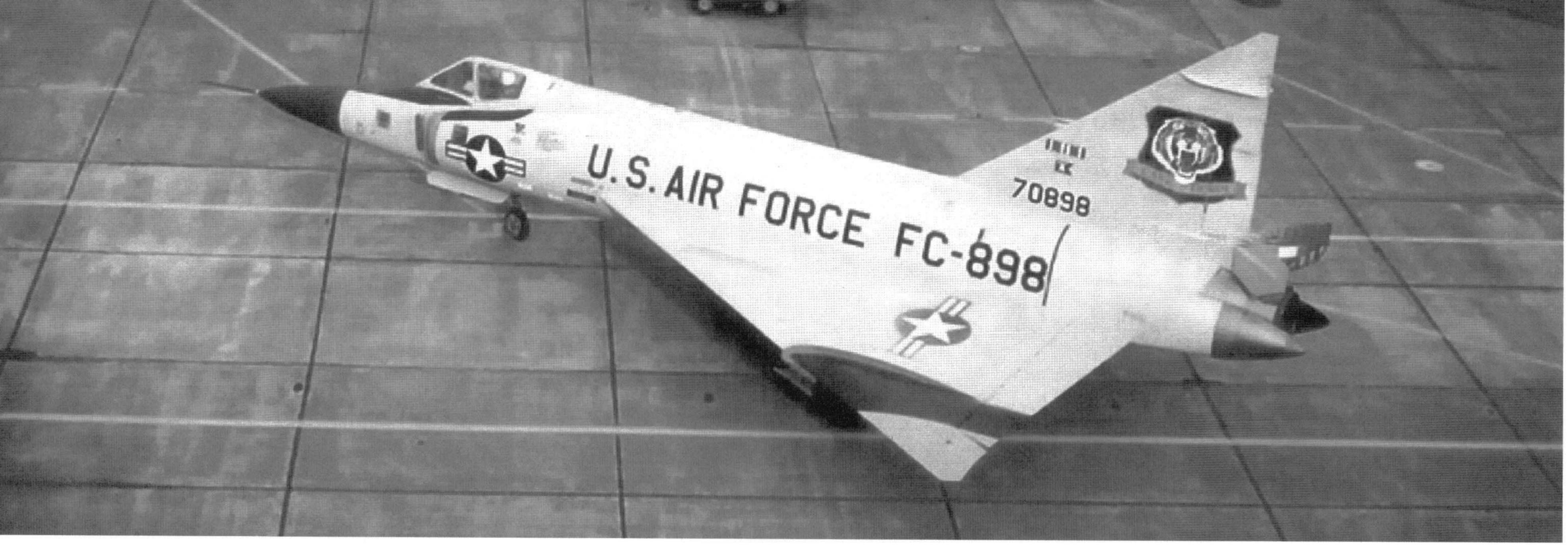
But they were being shadowed by a pair of North Vietnamese Air Force MiG-21s armed with Atoll air-to-air missiles, the Soviet equivalent of the Sidewinder. One of the MiG-21s got close enough for a shot and fired an Atoll at the unsuspecting flight of F-102s. The missile impacted Lt. Wallace Wiggins' F-102A, 56-1166. Although it didn't explode, it did hit a vital spot, and Wallace's F-102A broke apart and exploded. Capt. Al Lomax, flying the other F-102A, did get off a volley of three AIM-4s at the streaking MiG-21s but hit nothing. Lt. Wiggins was declared killed in action in the explosion of his F-102A.

Deployments to the Far East resulted in two other modifications to the F-102 — an inflight refueling capability and the covering of the light Gloss Grey paint with the greens, tan, and light gray of the new Southeast Asia camouflage scheme. The addition of a fixed probe on the right upper fuselage just aft of the cockpit allowed the F-102A to utilize the "probe and

(▸▸ 33)

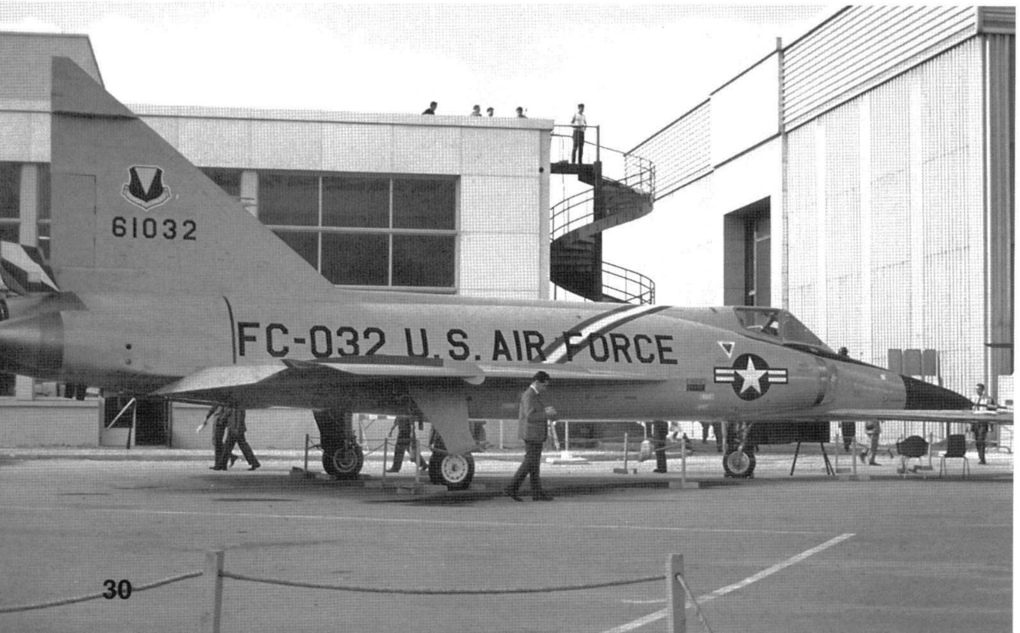
An F-102A-25 from the 496th FIS on the hardstand at Hahn AB, West Germany, in the early 1960s. The 496th FIS became the second USAFE squadron to fly the F-102A when they transitioned from F-86Ds in December 1959. This 496th FIS F-102A has the upturned wingtips of the "Case X" wing. (David Menard)



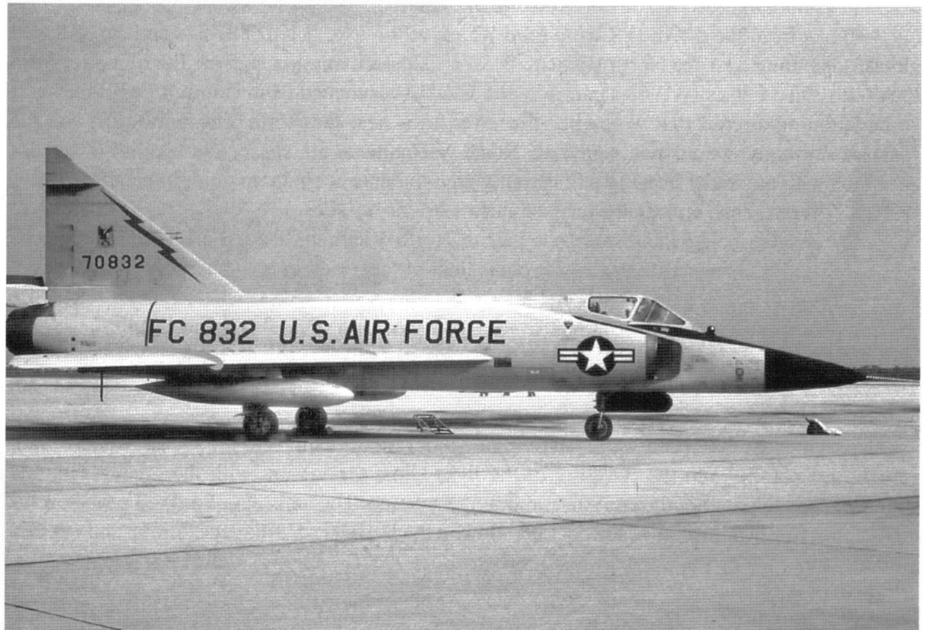


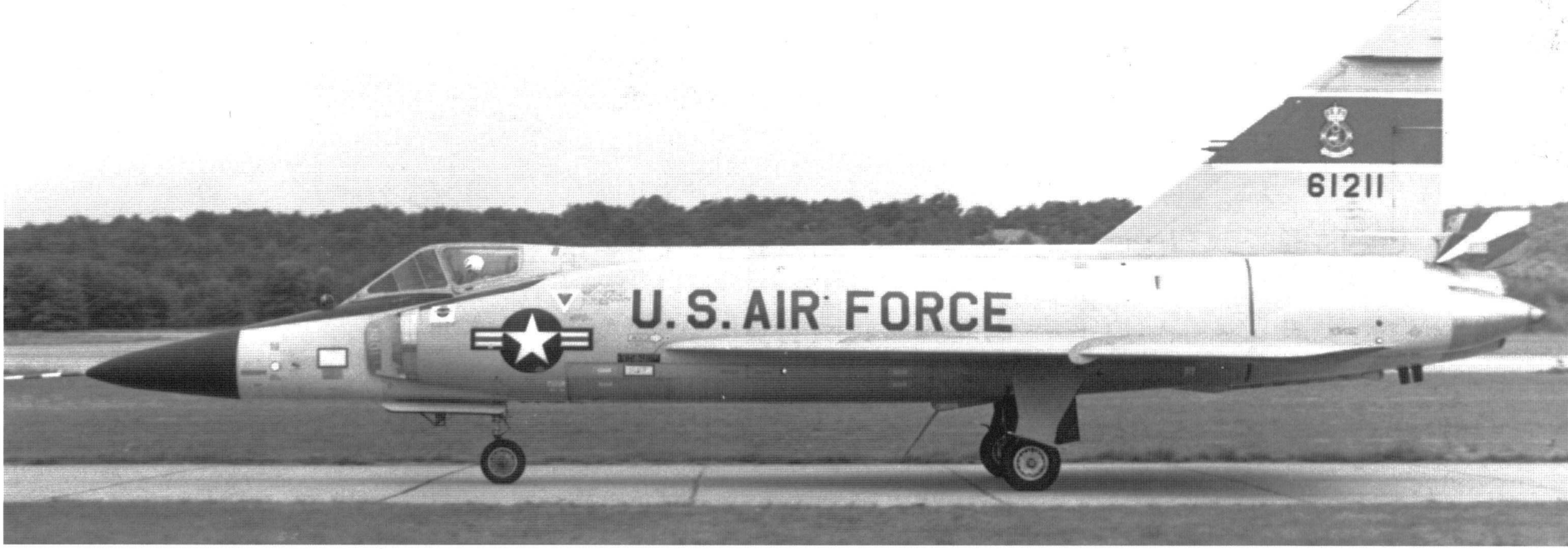
A pilot from the 460th FIS pulls back into his parking spot at Portland International Airport, Oregon, in January 1961 in an F-102A-95, the last production model of the F-102. The last of 889 F-102As were delivered to the Air Force in September 1958. Many ADC squadrons were based at civilian airports during the Cold War era. (John Lucky via Ron Picciani)

A 32nd FIS F-102A-55 on the ramp during the 1965 Paris Air Show. The 32nd FIS went operational in the F-102A in November 1960. Based at Soesterburg, Netherlands, the 32nd, although assigned to the 86th Fighter Wing in USAFE, was under the operational control of the Royal Netherlands Air Force. The "Case X" wingtips can be clearly seen. (J. Magendie)



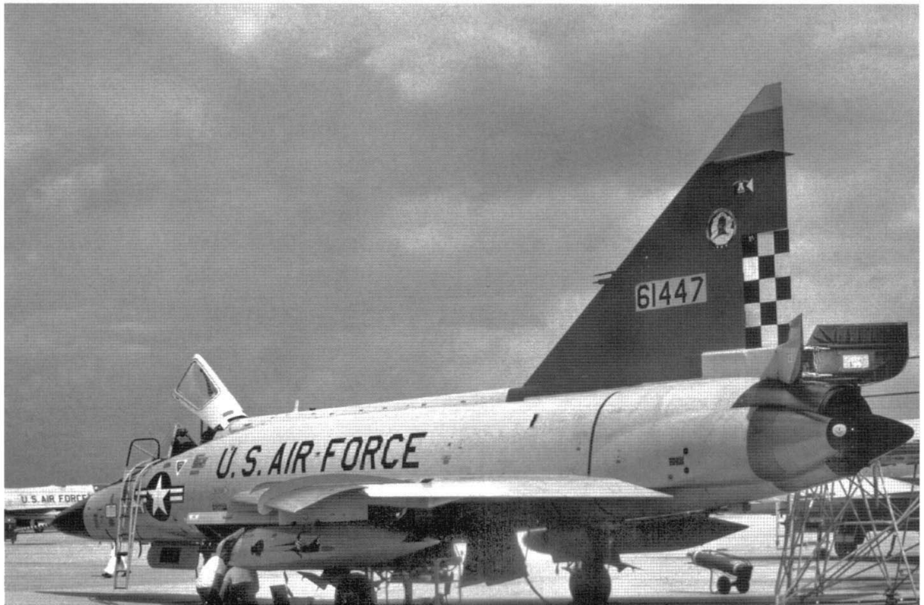
An F-102A-90 from the 482nd FIS at Seymour Johnson AFB, North Carolina, on the ramp at Andrews AFB, Maryland, during a visit in May 1964. Detachments of F-102As were routinely deployed to bases around the nation's capitol in the Cold War era. (Frank MacSorley via Ron Picciani)



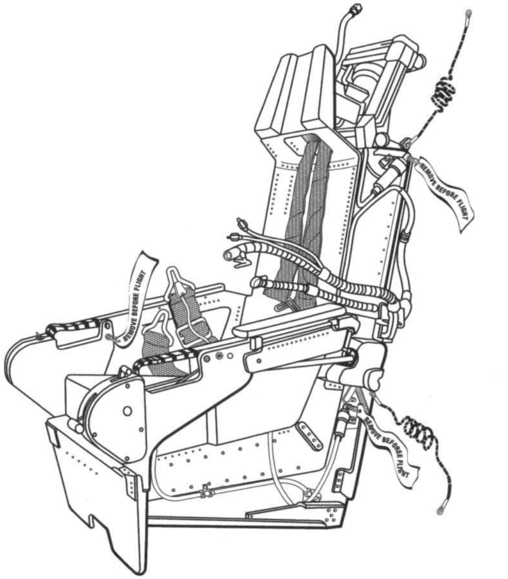

61211
U.S. AIR FORCE

A 32nd FIS F-102A-65 taxies back to its parking spot on the ramp at Soesterberg AB, Netherlands, in 1962. Barely discernable is the addition of the tail hook under the rear fuselage, which was added as part of the Project BIG EIGHT modifications. The tail band on 32nd FIS aircraft was green. (Joe Bruch)

Armorers can be seen working on the intricate missile launch system in an F-102A-80 from the 57th FIS during the 1972 William Tell Meet held at Tyndall AFB, Florida. The 57th FIS operated the F-102A from August 1962 to July 1973 and was the last Air Defense Command unit to fly the "Deuce." Note the distinctive downturn of the "Case XX" wing leading edge and wingtips. The ADC "A for Excellence" pennant is above the 57th FIS patch. (Tom Brewer)


61447
U.S. AIR FORCE
U.S. AIR FORCE

Ejection Seat and Control Column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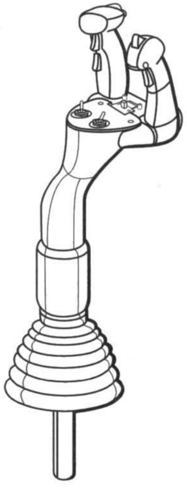
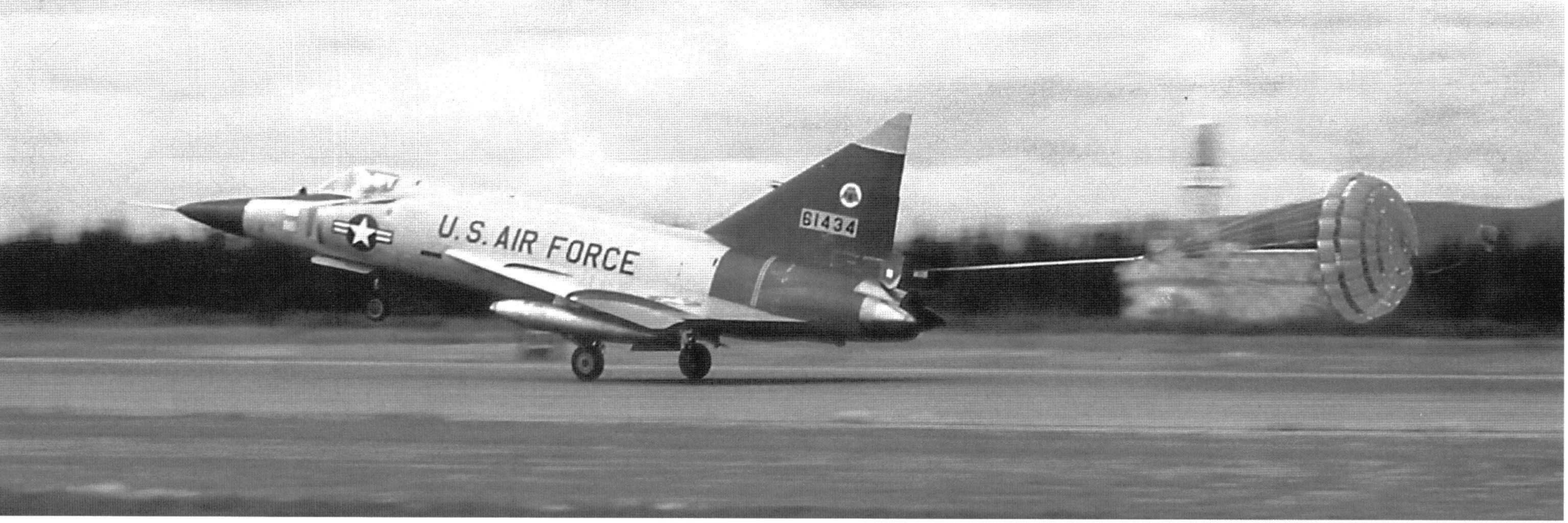
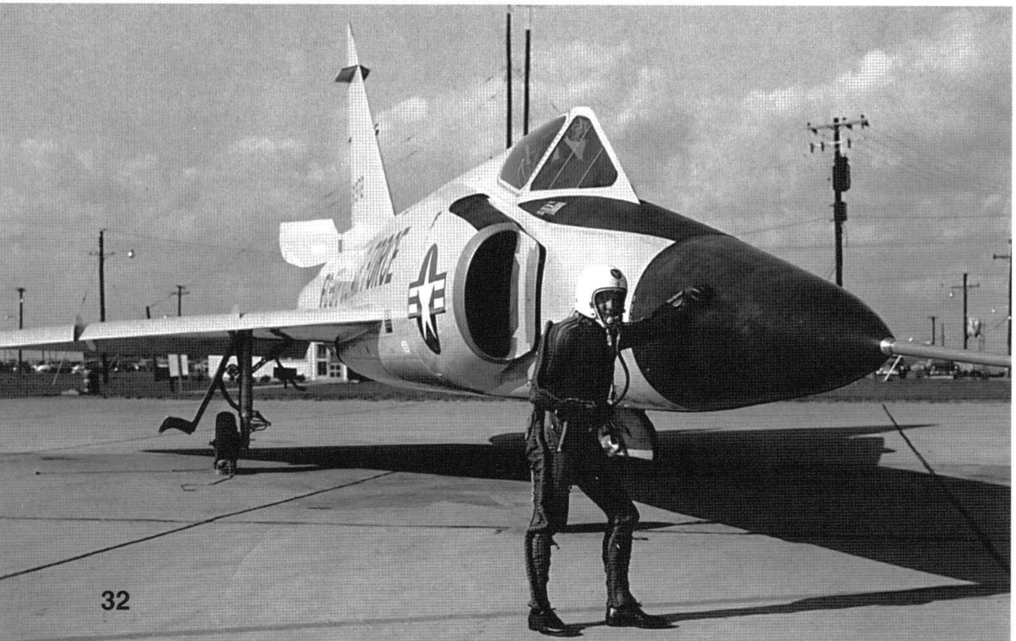


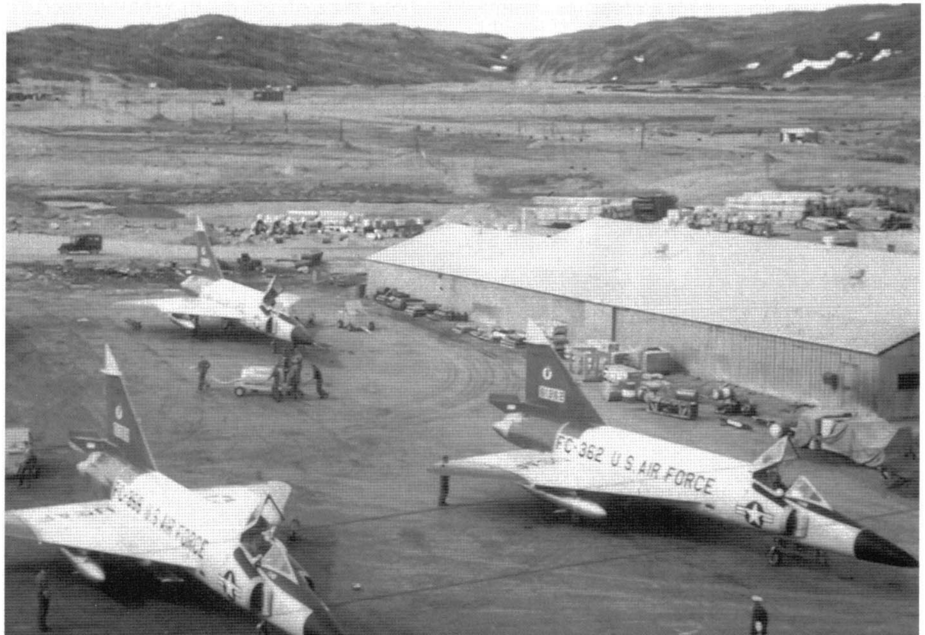


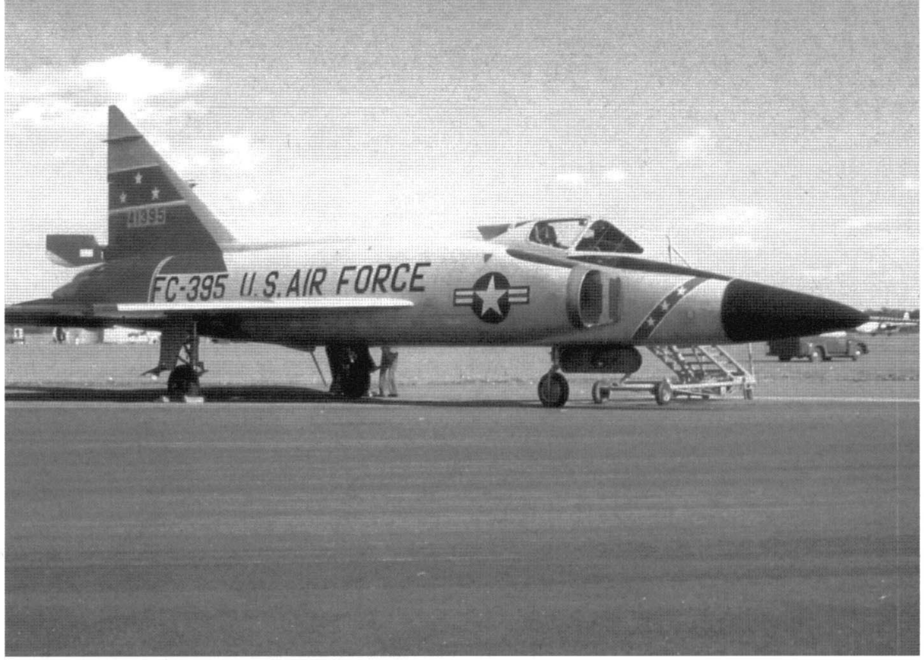
The pilot of this 59th FIS F-102A-80 pops the chute as he touches down at Goose Bay, Labrador, in 1965. Braking parachutes were necessary to slow the F-102 since the airplane did not have landing flaps. Aerodynamic braking was performed by the pilot holding the nose high at an angle of 18 degrees during landing.The 59th FIS transitioned from Lockheed F-94B Starfires to F-102As in May 1960. (Howard Jurgensen via Ron Picciani)

Lt. Myers, a pilot with the 332nd FIS at McGuire AFB, New Jersey, models one of the new MC-3 high-altitude pressure suits that were good up to 198,000 feet. However, the F-102 pilots rarely would use them, preferring to wear the normal flight suit coveralls and anti-G "chaps." (USAF)

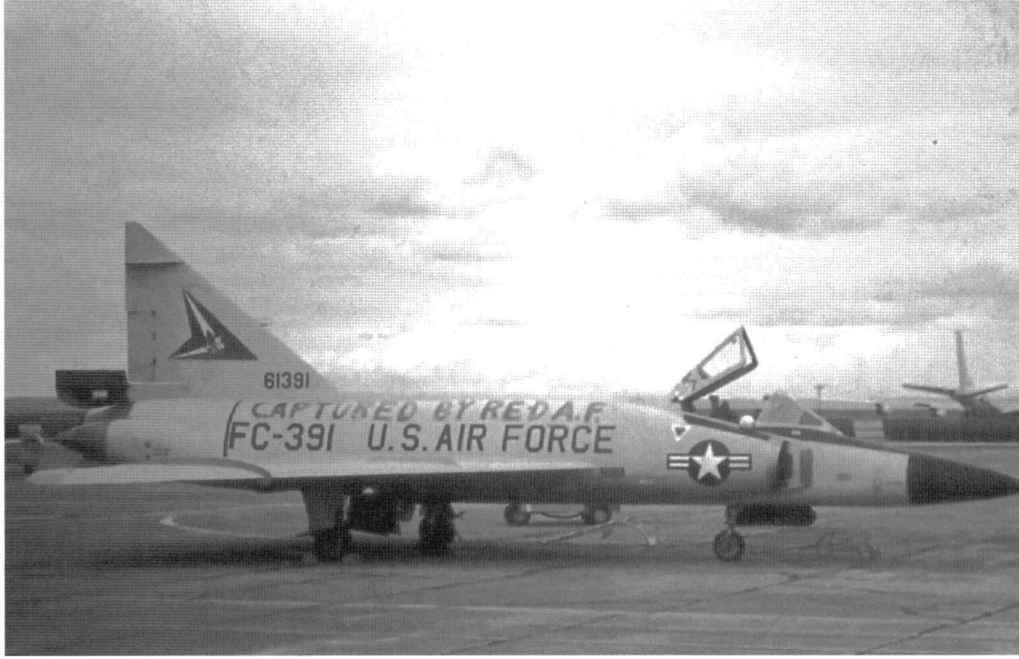


F-102A-75 Delta Daggers of the 327th FIS in the parking area of Frobisher Bay during the July 1958 deployment to Thule, Greenland. The 327th FIS would remain at Thule until March 1960. (Budd Butcher)





An F-102A-35 assigned to the 37th FIS at Ethan Allen AFB, Vermont, on the ramp at Grenier AFB, New Hampshire, during an open house in May 1957. As airborne scrambles could take them far into Canada's airspace, F-102s from the 37th FIS were required to have Red tails and wingtips. The 37th FIS operated the F-102A from January 1958 until May 1960. (Gordon Blake via Ron Picciani)



(Above) The "Red Team" claimed ownership of this F-102A-75 from the 64th FIS "Blue Team" at Paine Field, Washington, during a war game in 1964. Two years later, it wouldn't be a game anymore when the 64th FIS deployed first to Clark AB, Philippines, then to combat in the skies over Vietnam. (USAF via Ron Picciani)

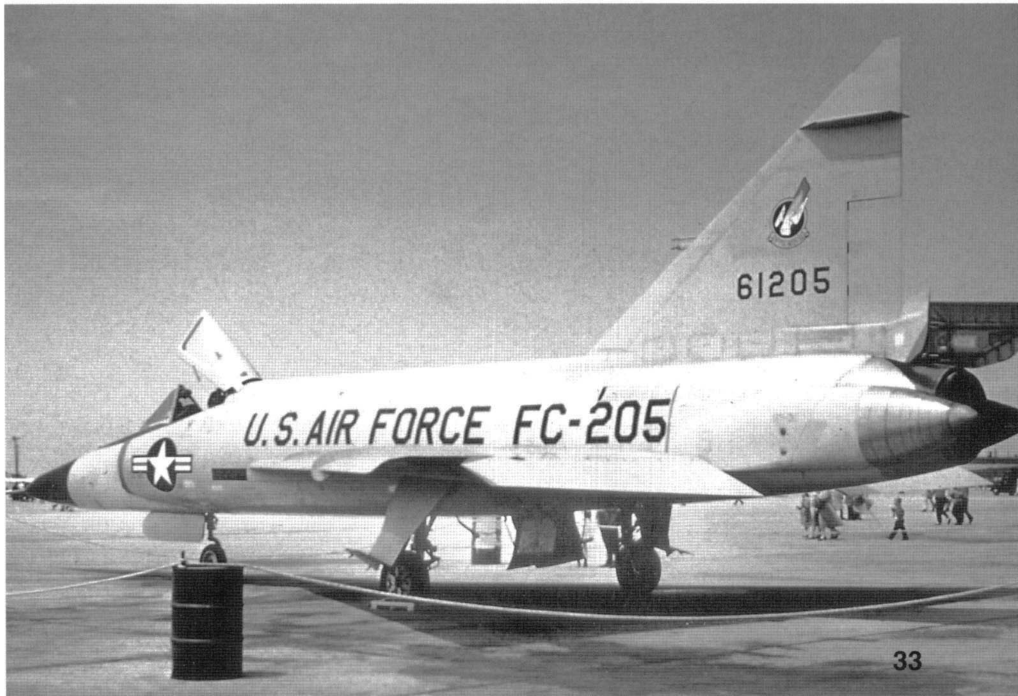
drogue" inflight refueling method. The first unit to use the new inflight refueling was the 64th FIS which took its Delta Daggers from Hamilton AFB, California, to Clark AB, Philippines, on 6 June 1966. The 82nd FIS at Travis AFB followed a similar route when they deployed to Naha AB, Okinawa, later that same month. Both squadrons were rotated at regular intervals to "hot zones" in the Far East; the 64th was part of the CANDY MACHINE deployments to Thailand, while the 82nd put in regular TDY stops to bases in Korea.

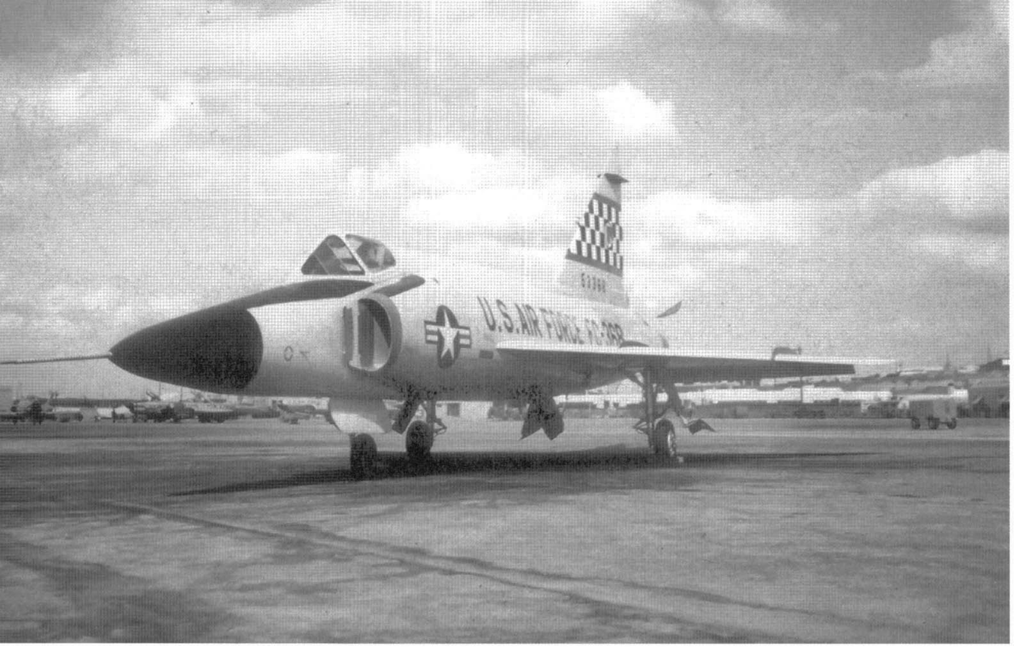
Additional post-production modifications to the F-102A included a barrier arrestor hook for use during emergency landings. Other combat modifications included the ability to carry one of the many ECM pods available to crews operating near the North Vietnamese ground defenses, or the AN/ALE-2 chaff dispenser in place of the underwing tanks. But no radar homing and warning (RHAW) defenses were added to the F-102s operating in Southeast Asia, despite missions which put them very close to North Vietnamese SAMs and MiGs.

The CANDY MACHINE deployments to South Vietnam ended on 25 September 1968, while deployments to bases in Thailand continued until November 1969. When the 82nd FIS was inactivated at Naha in March 1971, the remaining flyable aircraft were transferred to Air National Guard squadrons in the United States. All remaining aircraft were scrapped in place. It was the end of PACAF operations with the F-102.

(⏩ 34)

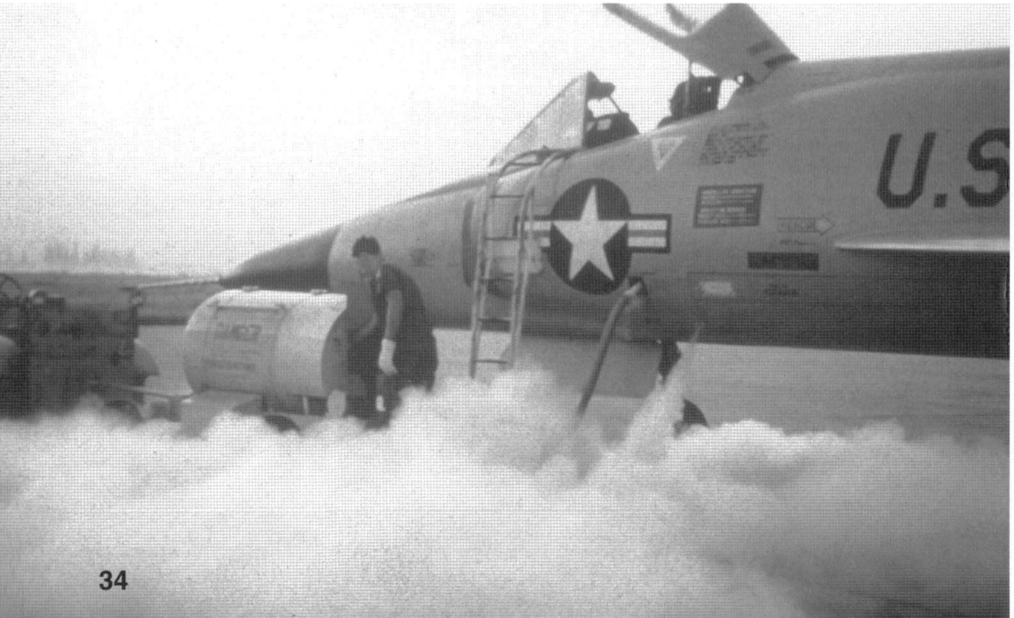
(Right) A 71st FIS F-102A-65 on the ramp at Langley AFB, Virginia, during an air show in 1959. The "Case X" wing with its distinctive upturned tip can be seen. The 71st FIS was based at Selfridge AFB, Michigan. (J. Anderson)

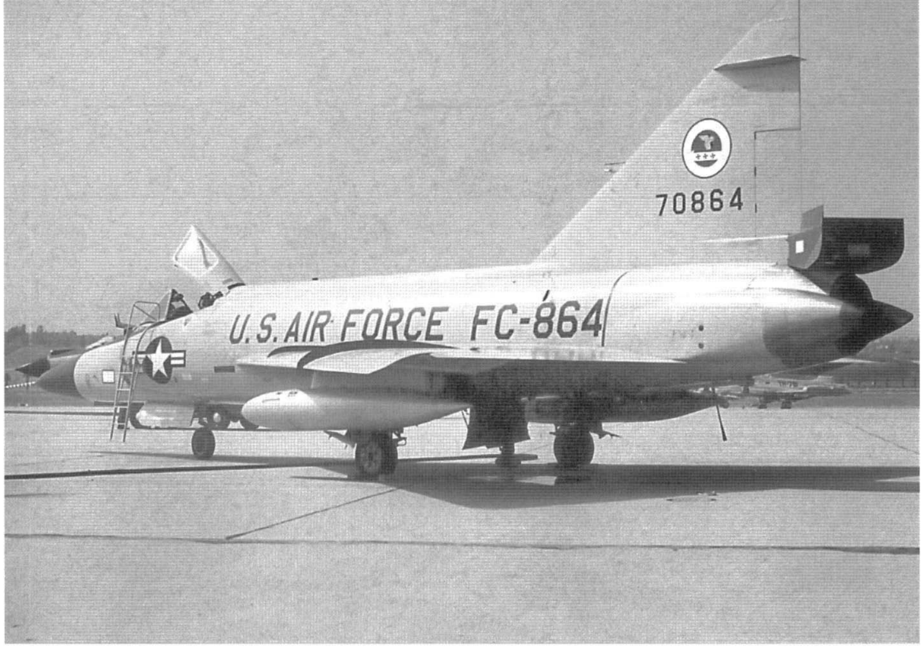




An F-102A-41 from the 16th FIS ready to roll on the flight-line at Naha AB, Okinawa, in 1960. The 16th FIS' Delta Daggers were some of the most colorful, having black-and-white checked tails with blue bands and wing fences. The F-102As from the 16th were transferred to the Hawaii Air National Guard in 1964. (USAF)

A crew chief services the liquid oxygen supply of a 509th FIS F-102A on the ramp at Don Muang Airport, Bangkok, Thailand, in January 1962. The 509th sent a detachment of four F-102As to Don Muang as part of Operation WATER GLASS in response to aggressive moves by North Vietnamese communists. (Bill MacDonald)





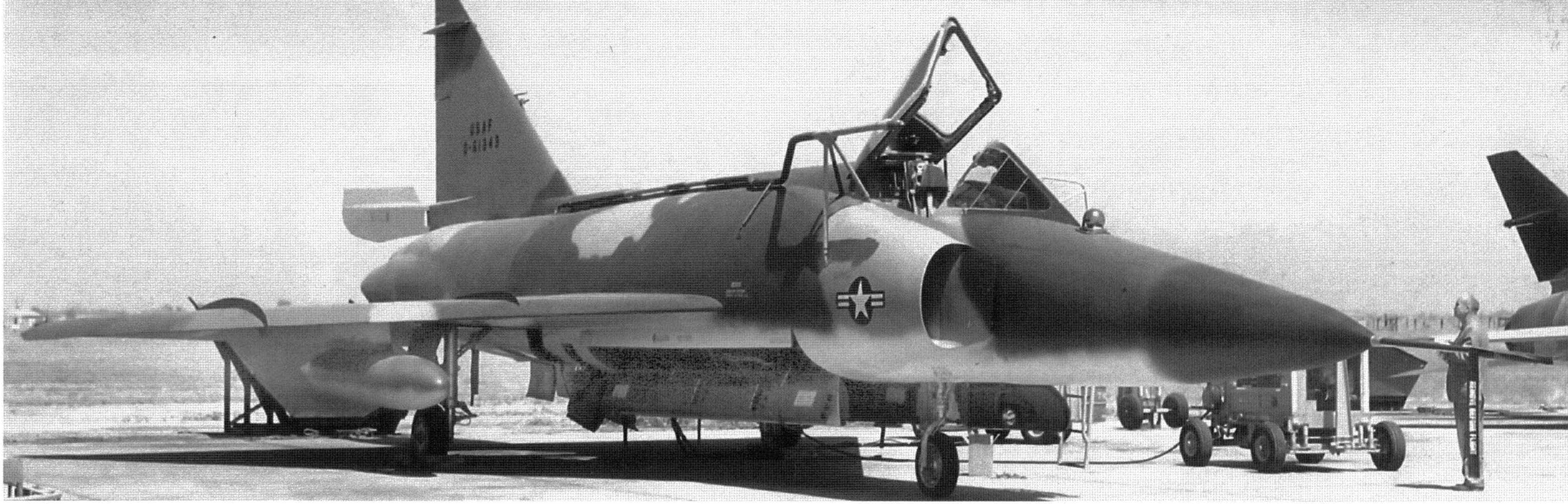
An F-102A-95 from the 82nd FIS based at Travis AFB, California, on the ramp at Oxnard AFB, California, during a July 1964 visit. The 82nd FIS would operate the F-102A at Travis AFB, from July 1957 to November 1965, when the Air Force sent them to Naha AB, Okinawa. (Robert Trimble via Ron Picciani)

Air Guard Service

F-102As began entering service with the Air National Guard in early 1960. The first unit to transition to the Delta Dagger was the 182nd FIS, Texas ANG, at Kelly AFB near San Antonio, which converted from F-86L Sabres on 1 July 1960. One of their missions was to keep an eye open for intruders coming from the island of Cuba, which had been turned into a communist nation after Fidel Castro overthrew the Battista government in 1959. That island nation would be the focus of many of the Guard units based in the southern United States. Certainly the most famous F-102 pilot was one that flew with the 111th FIS, Texas ANG, 1st Lt. George W. Bush, later to become the 43rd President of the United States.

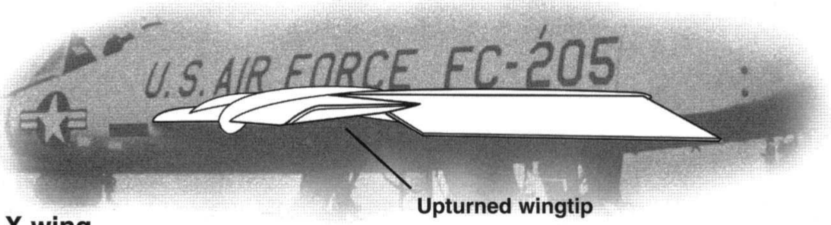
In all, a total of 22 Air National Guard squadrons operated the F/TF-102A between 1960 and 1976. The last Guard squadron to operate the Delta Dagger was the 199th FIS, Hawaii ANG, which retired its aircraft in October 1976. All Air National Guard squadrons operated under the control of Air Defense Command, later called Aerospace Defense Command, except the 199th FIS, Hawaii ANG, which was under the control of PACAF.

(▸▸40)

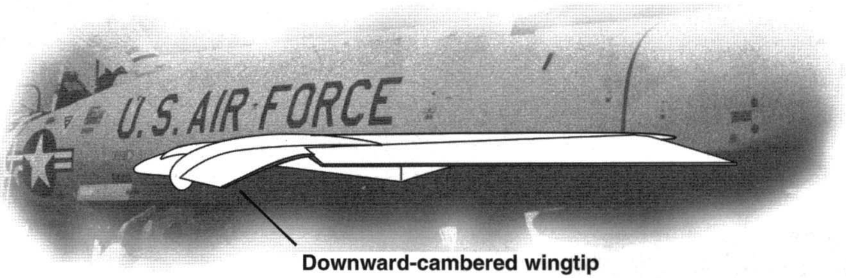


Operation THIRSTY CAMEL gave the F-102A an inflight refueling capability, albeit a temporary one. F-102As from the 64th FIS at Paine Field, Washington, would use the "probe and drogue" inflight refueling method to make the flight to Naha AB, Okinawa in November 1965. Prior to the deployment all the F-102As were painted in the Southeast Asia camouflage scheme of tan, two shades of greens, and light gray undersurfaces. (Peter Lewis via Ron Picciani)

Wing Variations

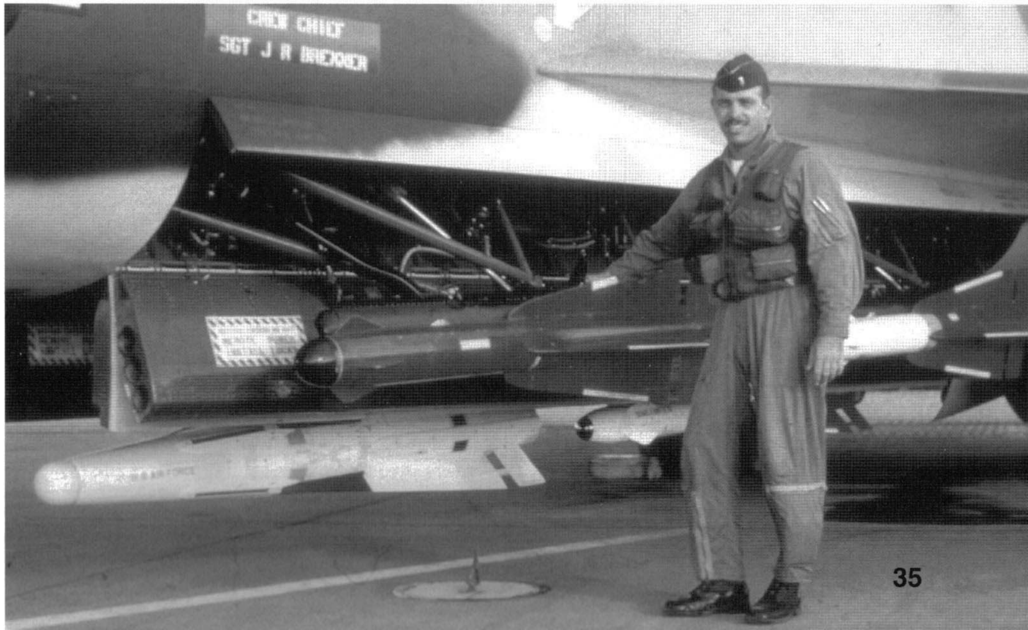

U.S. AIR FORCE FC-205
Upturned wingtip

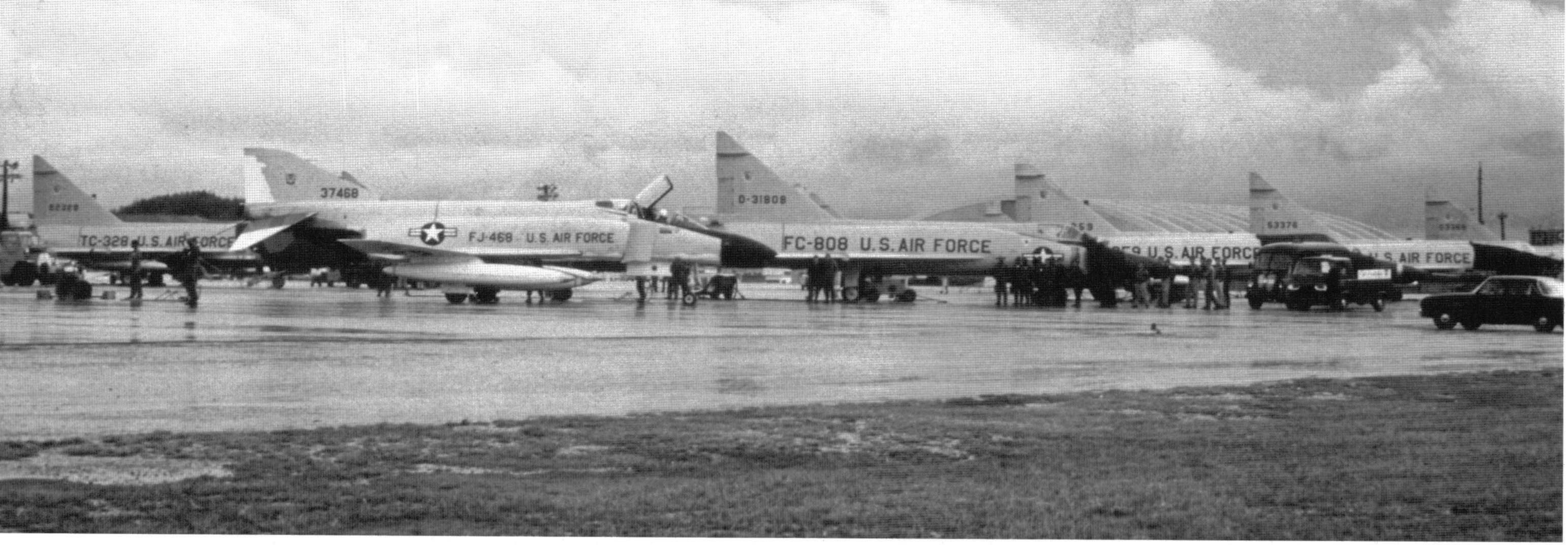
Case X wing


U.S. AIR FORCE
Downward-cambered wingtip

Case XX wing

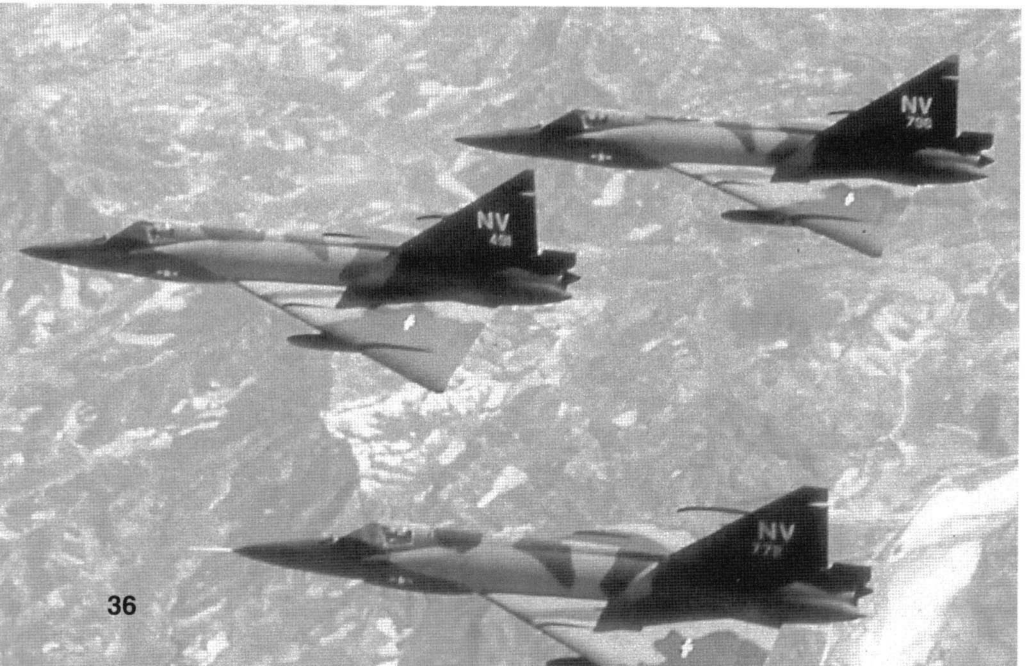
1st. Lt. Harry Hoover stands next to the open weapons bay of his 509th FIS F-102A on the alert pad at Udorn Royal Thai AB in late 1968. The all-white missile is an AIM-26 Super Falcon, the missiles in the front bay are all-red AIM-4C Falcons with infrared seekers, and the missiles in the aft bay are red-and-white AIM-4B radar guided Falcons. (Harry Hoover)


CREW CHIEF
SGT J R BREKNER

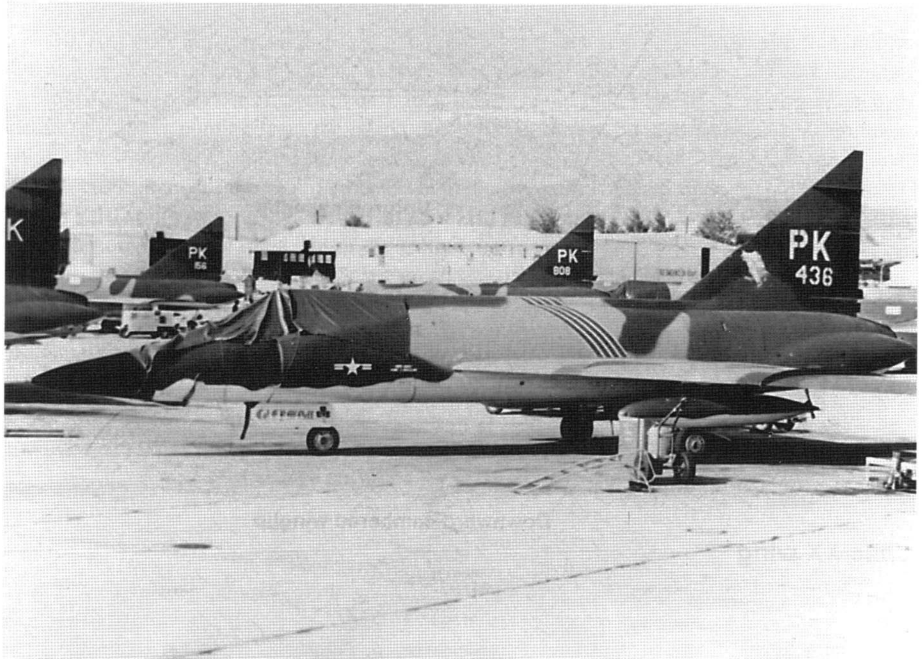

37468
FJ-468 U.S. AIR FORCE
0-31808
FC-808 U.S. AIR FORCE
TC-328 U.S. AIR FORCE

The first F-4Cs from the 555th TFS at Naha AB, Okinawa, sharing the ramp with F-102s from the 16th FIS during late 1964. The Phantoms would temporarily take over the air defense mission of the 16th FIS when that unit was deactivated in November 1964. (Don Dickman)

Detachments of 82nd FIS F-102s were routinely deployed to Suwon AB, South Korea, during the late 1960s in response to aggressive moves by the communist North Korean government. The "NV" tail codes were added in 1967. (Capt. A.K. Smith)



F-102As of the 509th FIS on the ramp at Bien Hoa, South Vietnam. PK 436 is the commander's F-102A as denoted by the black and yellow fuselage stripes. (Author's collection)


PK
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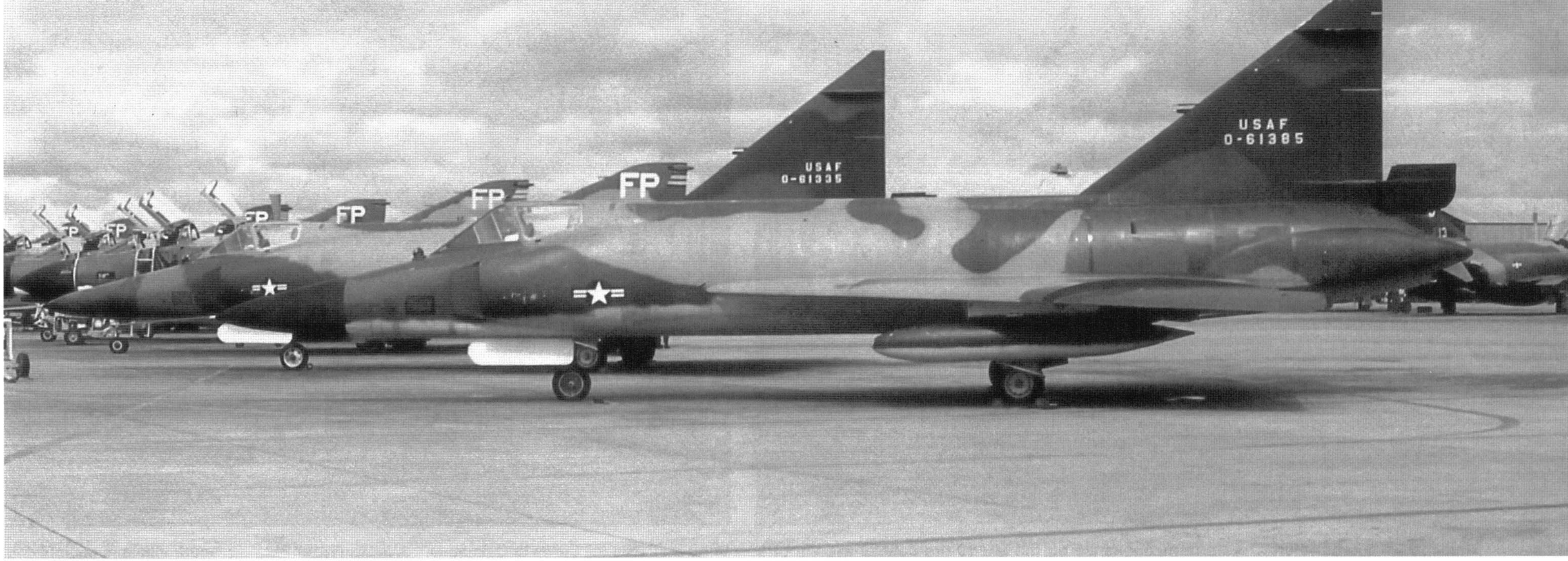
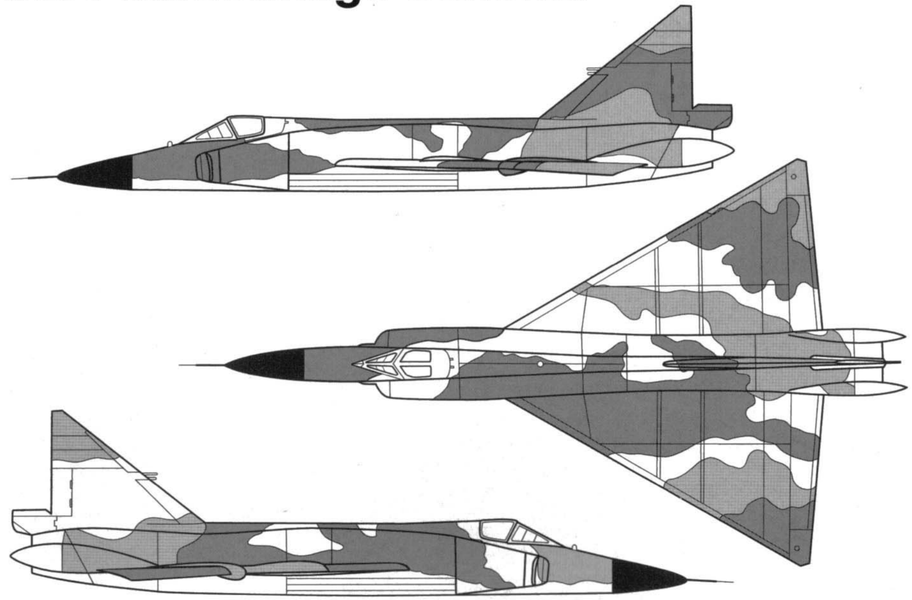
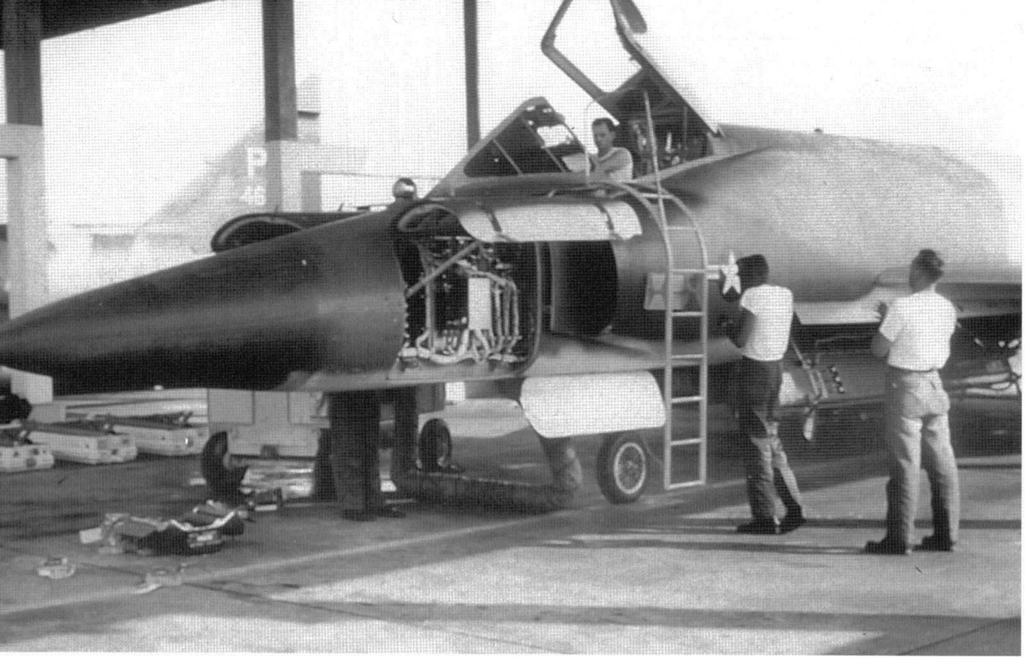


F-102A-75s from the 64th FIS share the ramp at Ubon RTAB, Thailand, with F-4Cs of Col. Robin Olds' 8th TFW on 15 July 1967. Detachments of F-102s from both the 64th and 509th Squadrons from Clark AB, Philippines, routinely deployed to bases in Thailand and South Vietnam to provide base defense during the war. (Frank MacSorley via Ron Picciani)

An 82nd FIS F-102A receives fuel from a SAC KC-135A tanker via the fuel probe that was temporarily installed on 82nd FIS Delta Daggers for the trans-Pacific flight to their new home at Naha AB, Okinawa, in 1966. (USAF)

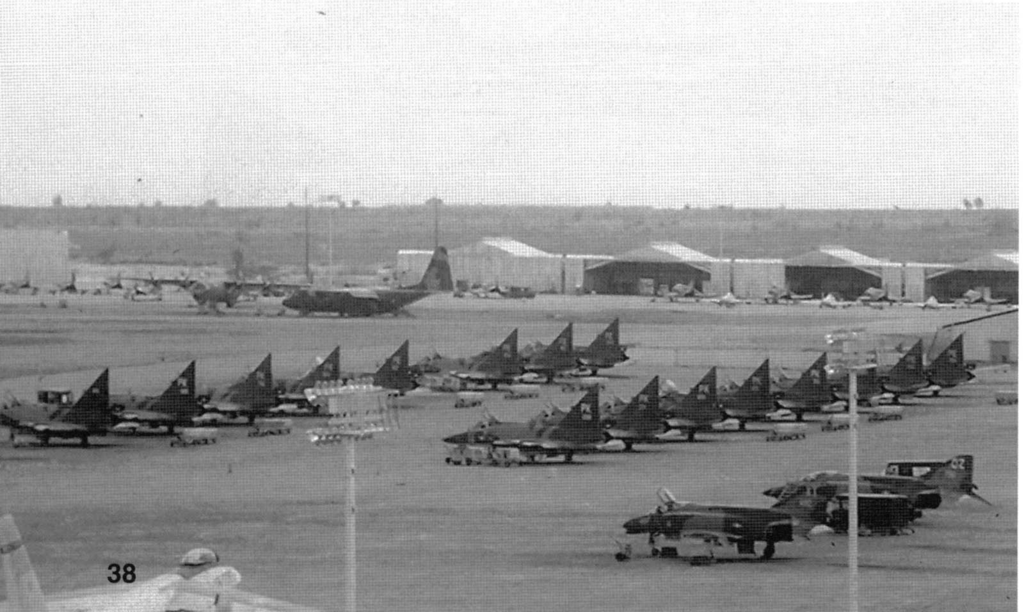
SEA Camouflage Scheme

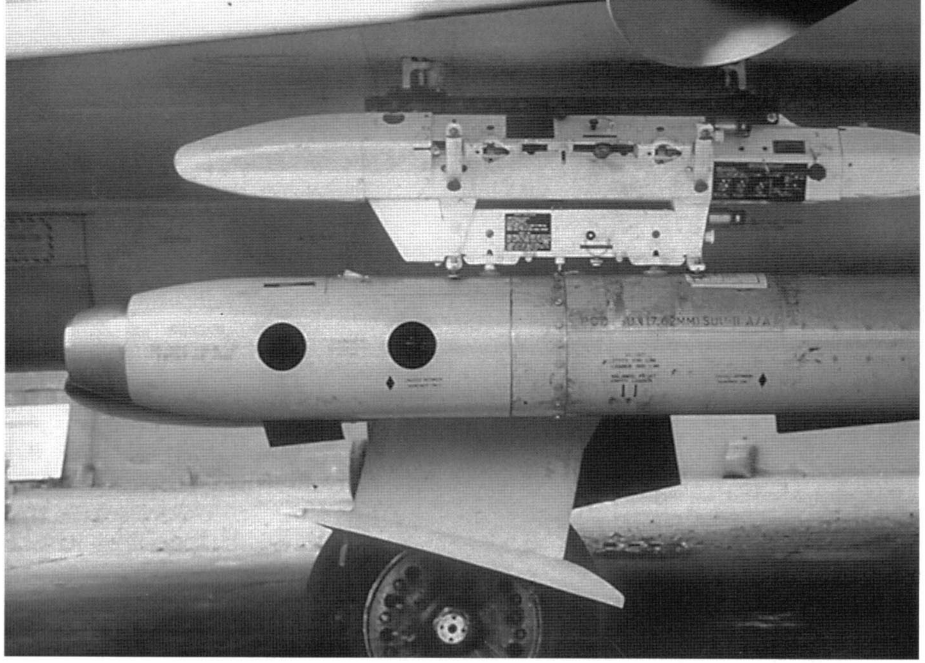




Detachment 5 ground crew perform maintenance on the MG-10 fire control system of a 509th FIS F-102A at Bien Hoa AB, South Vietnam, in April 1968. The F-102 deployments to Southeast Asia were part of Operation CANDY MACHINE, which lasted until September 1968. (E. John Raboin)

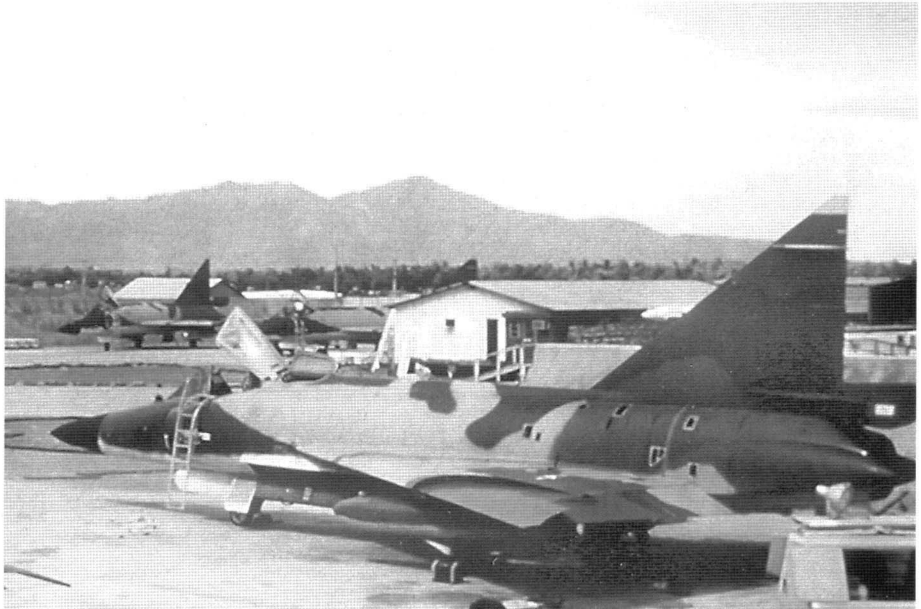
The 509th FIS shares the ramp at Tan Son Nhut AB, South Vietnam, in May 1969 with F-4Cs and a pair of WB-47Hs. It was very unusual to have the entire F-102A deployment at one base. Normally, detachments of four to six Delta Daggers were sent to bases in Thailand (Udorn and Don Muang Airport) and South Vietnam (DaNang and Tan Son Nhut). (Jack Freeburger)

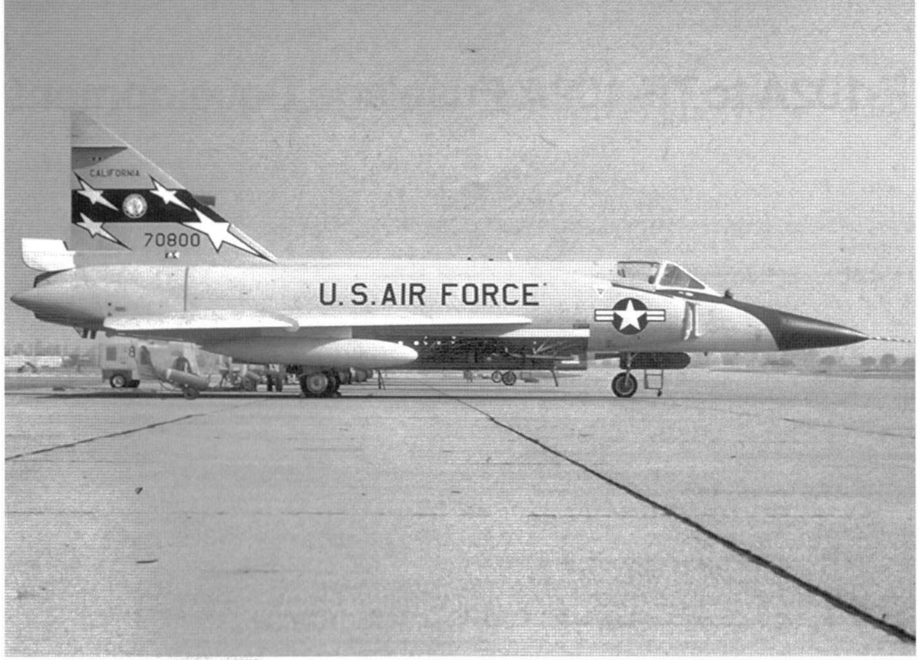




In August 1966 the crews of Detachment 3, 509th FIS, at DaNang, South Vietnam, equipped at least one of their F-102As with a underwing SUU-11 Minigun pod for air-to-ground operations. The SUU-11 pod was installed on a Triple Ejector Rack (TER). No bombs could be carried on the TER as the F-102A did not have wiring to drop bombs. (Bill Winkeler)

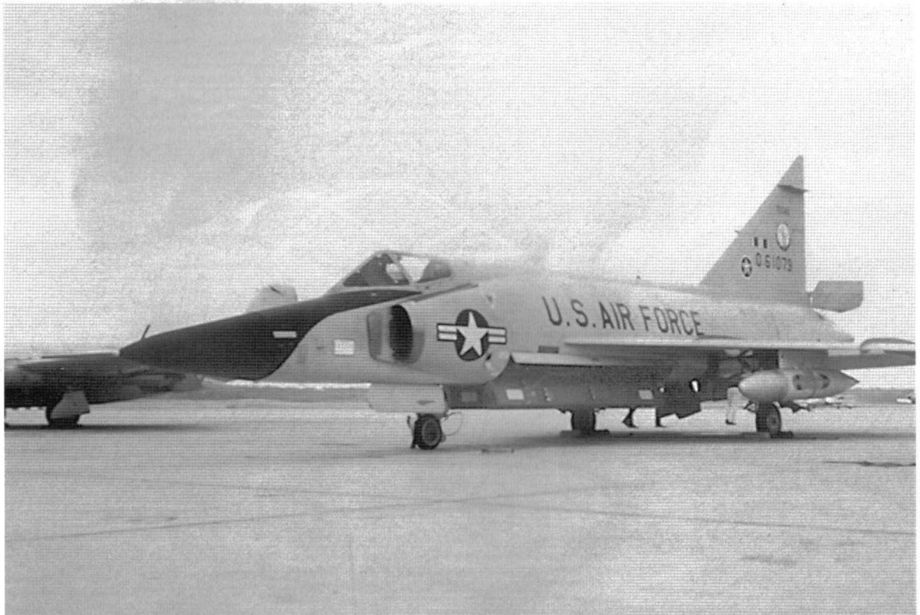
A detachment of F-102As from the 64th FIS in the alert area at DaNang AB, South Vietnam in September 1966. The 13th Air Force kept at least six Delta Daggers on alert at DaNang until 1968. The F-102As flew a variety of missions including long-range escort of ARC LIGHT B-52s. (Ron Hoelzer)

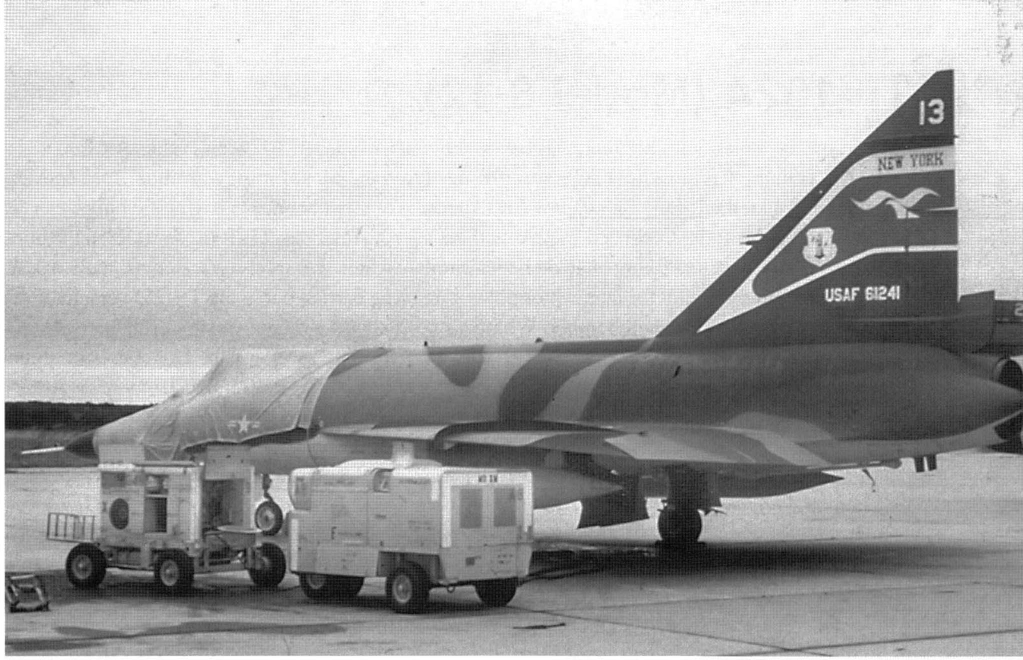




An F-102A-90 from the 196th FIS, California Air National Guard, on the ramp at Ontario Airport in 1974. F-102s began entering service with the Air National Guard in spring 1960. The 196th FIS converted from F-86Ds to F-102As in May 1965. (Robert F. Dorr)

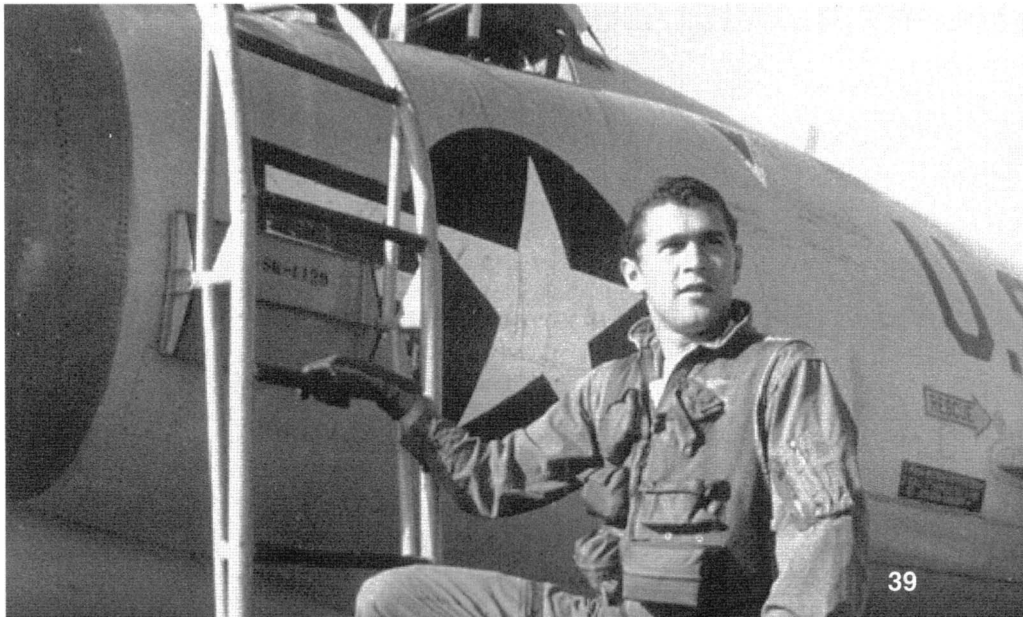
An F-102A-60 from the 111th FIS, Texas Air National Guard, on the ramp at Ellington AFB, Texas, in May 1968. The first F-102s to enter service in Guard squadrons went to the other Texas squadron, the 182nd FIS at Kelly AFB. (Robert F. Dorr)





An F-102A-70 from the 102nd FIS, New York Air National Guard, on the ramp at Suffolk County Airport, New York, in September 1976. The 102nd FIS operated the F-102 from December 1972 to June 1975. This airplane still has the "Case X" wing. (Doug Barbier)

Certainly the most famous F-102 pilot was 1st. Lt. George W. Bush, later the 43rd President of the United States. Lt. Bush was a pilot in the 111th FIS, Texas ANG, during the early 1970s when the squadron flew F-102As. (Texas Military Forces History Museum)



TF-102A (Model 8-12)

Because of the radical differences between the delta-winged F-102A and other Air Force aircraft, Air Training Command (ATC) faced the need to train pilots for the transition from conventional aircraft like the F-86D Sabre, and Air Defense Command concurred. But the only other jet trainer in service was the Lockheed T-33A, with the North American TF-100C/F-100F on the horizon, and neither type had flying characteristics similar to, nor was as complicated as, the F-102A. Furthermore, radar training for interceptor pilots was being carried out in the TB-25J version of the World War II-vintage Mitchell bomber. What was needed was a trainer version of the F-102A.

In April 1952, with ATC and ADC approval, the Air Force set down the General Operational Requirements (GOR) for a two-seat, dual-control version of the F-102, and Convair engineers began planning and design work on the two-seat variant, known as model 8-12. Air Force approval was granted on 16 September 1953, but the trainer program was put on hold until the problems that had been encountered with the YF/F-102A were overcome. The mockup of the trainer nose was built at Convair's Ft. Worth, Texas, plant and approved by the Air Force in September 1954.

The trainer variant would be identical to the single seat variant from the leading edge of the wing aft. But unlike other trainer aircraft types, the TF-102 would feature side-by-side seating rather than the normal tandem seating used in the T-33A, TF-86F, and the TF-100C. The cockpit was widened eleven inches, and an entirely new canopy was designed to fit over the wider cockpit, which contained identical sets of controls for both pilot and co-pilot, including duplicate fire control system radar displays. An entirely new nose section was designed to attach to the single-seat interceptor's rear fuselage and wing structure.

One of the requirements of the Air Force set forth in the original GOR was that the TF-102 not only be a dual-control trainer but also must be a dual-role aircraft — trainer and interceptor. The TF-102A would be fully combat capable, and both pilots could fire the weapons, which were identical to that of the single seat fighter — six AIM-4 Falcon missiles and 24 FFAR rockets within the weapons bay doors.

The TF-102A also used the same Hughes MG-3 FCS as the F-102A. However, when the F-102A was upgraded with the MG-10 FCS, the TF-102As were not retrofitted with the new unit.

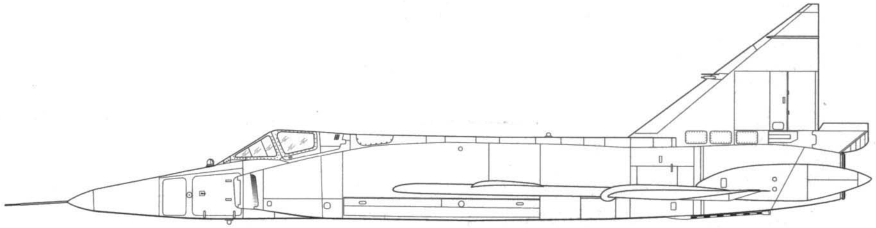
In July 1954, the Air Force placed an initial order for 20 TF-102As, followed by an additional order for 28 more in early 1955. As with the mockup, the Convair plant in Ft. Worth would construct the nose, which would then be transported to San Diego for mating to an F-102A airframe. Rollout of the first TF-102A, serial 54-1351, came in October 1955, and Convair pilot Dick Johnson made the first flight on 8 November 1955.

Except for the enlarged forward fuselage, which led to the aircraft's nickname of "Tub," the TF-102A was quite similar to the single-seat fighter in planform and performance. The TF-102A retained the original "Case X" wing and short vertical fin as on the initial batch of F-102As, but the fuselage was five feet shorter, at 63 feet 4½ inches. Power came from the same Pratt & Whitney J57-23 engine rated at 16,000 pounds thrust in afterburner.

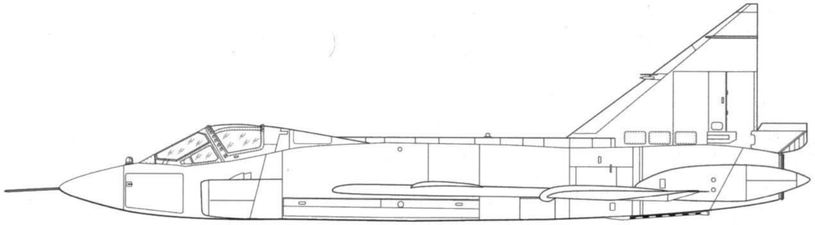
The bulkier forward fuselage and second cockpit added over 500 pounds to the combat weight of the TF-102A, and due to the additional weight and drag of the new, wider nose, the TF-102A was quite a bit slower than the single seater, with a top speed of Mach 1.0. Rate of climb and service ceiling were comparable.

Early flight tests indicated several problems with the TF-102A. All of the problems associated with the single seat variant, such as a lack of directional control due to the short fin, were also found and corrected on the TF-102A. Installation of the taller vertical fin corrected the (▶▶44)

F-102A to TF-102A Fuselage Development

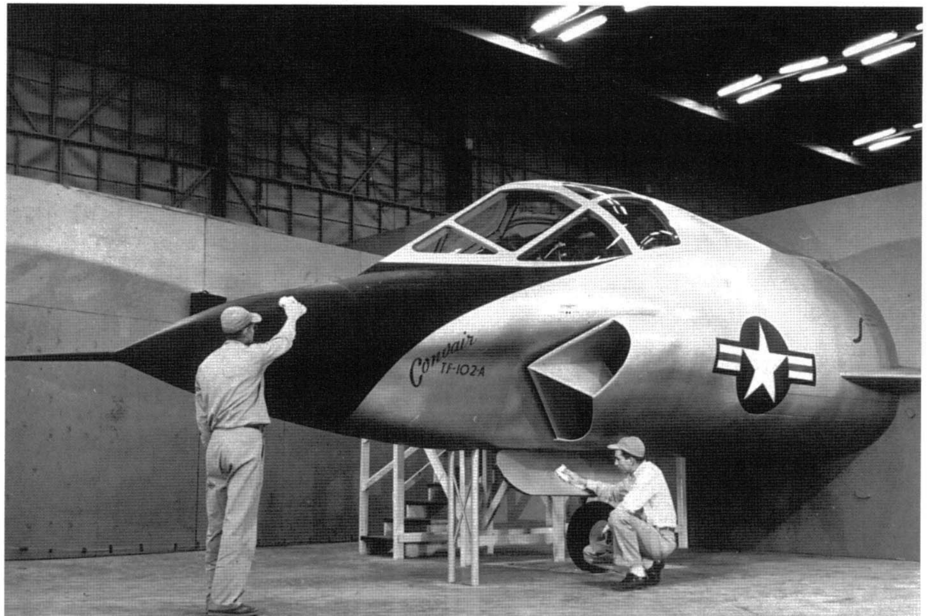


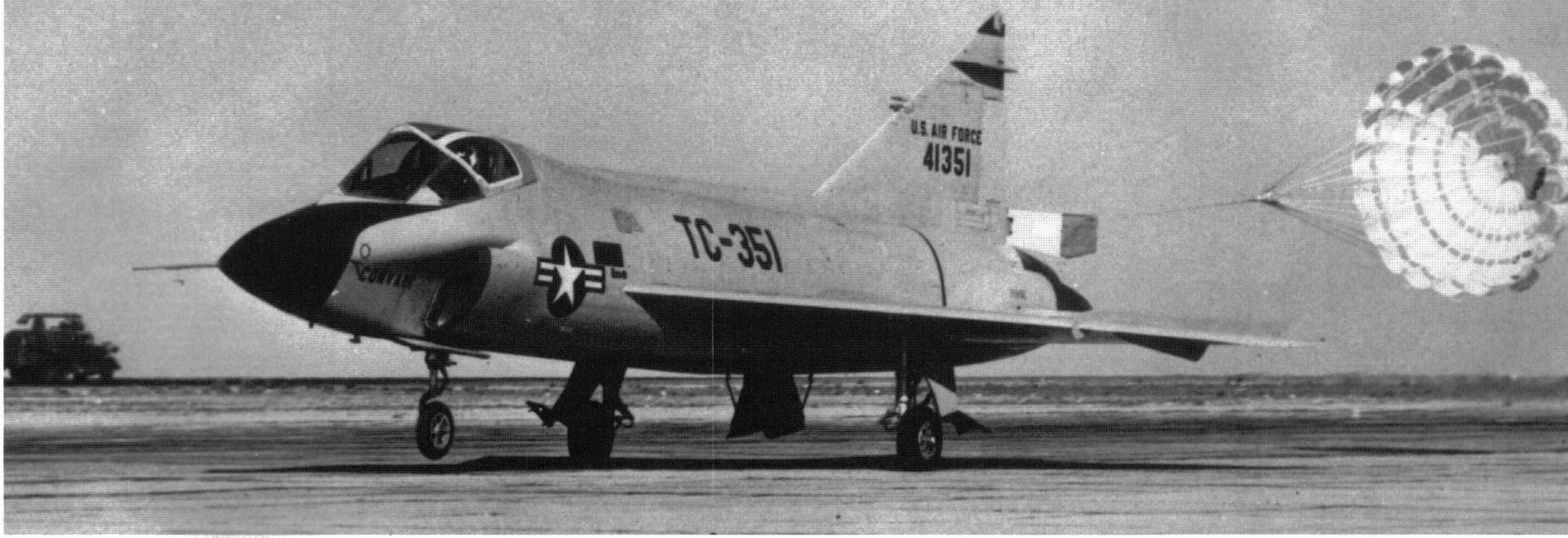
F-102A



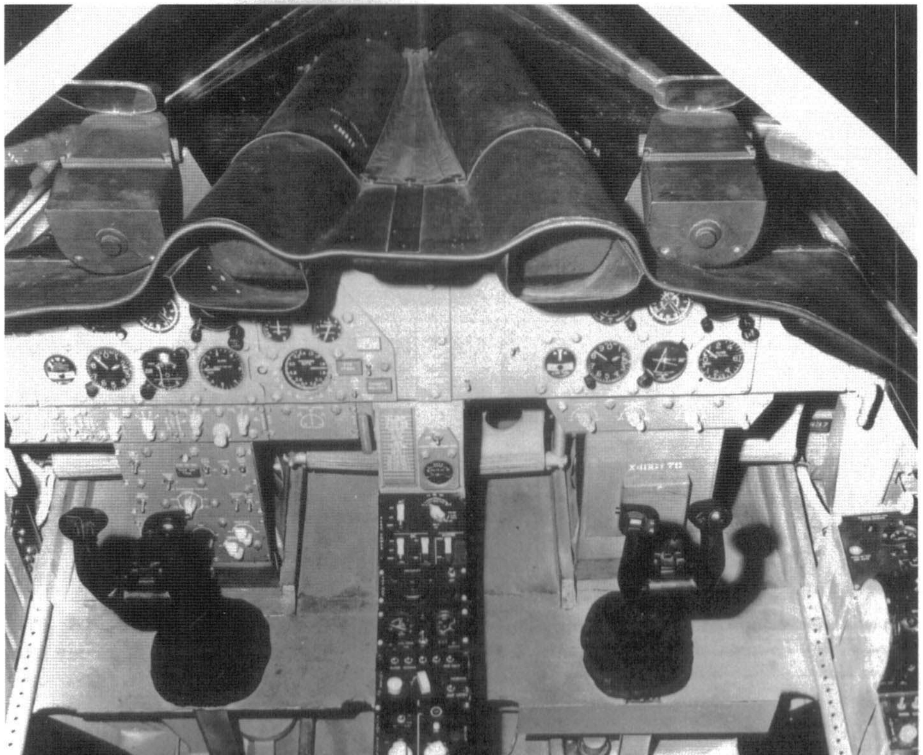
TF-102A

Convair workmen put the finishing touches to the TF-102A prototype mockup in September 1954. The split engine intakes were deleted on production fuselages. The TF-102A forward fuselages were built in the Ft. Worth Convair plant then transported to San Diego where they were mated with a standard fighter wing and aft fuselage. (Robert F. Dorr)



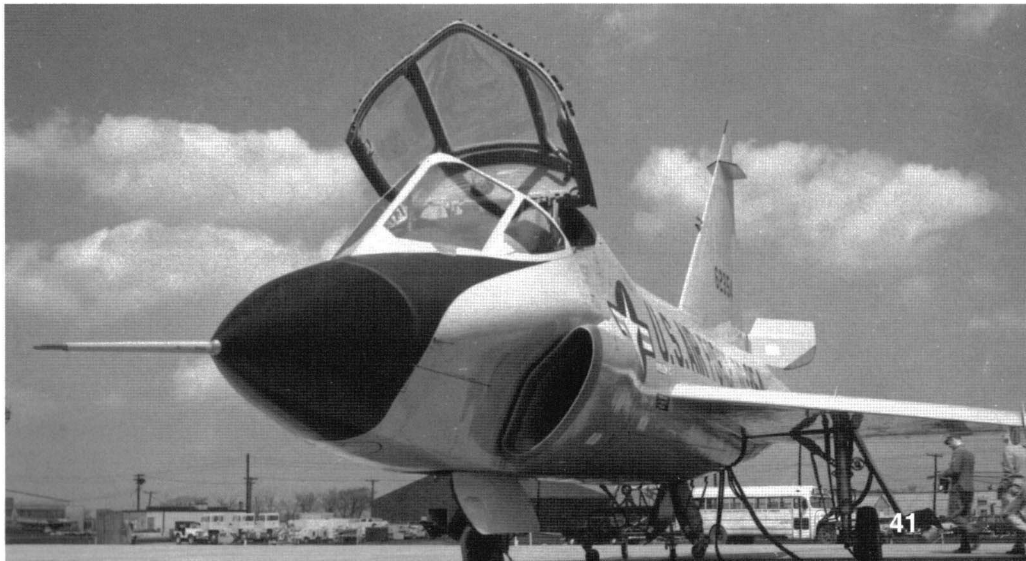


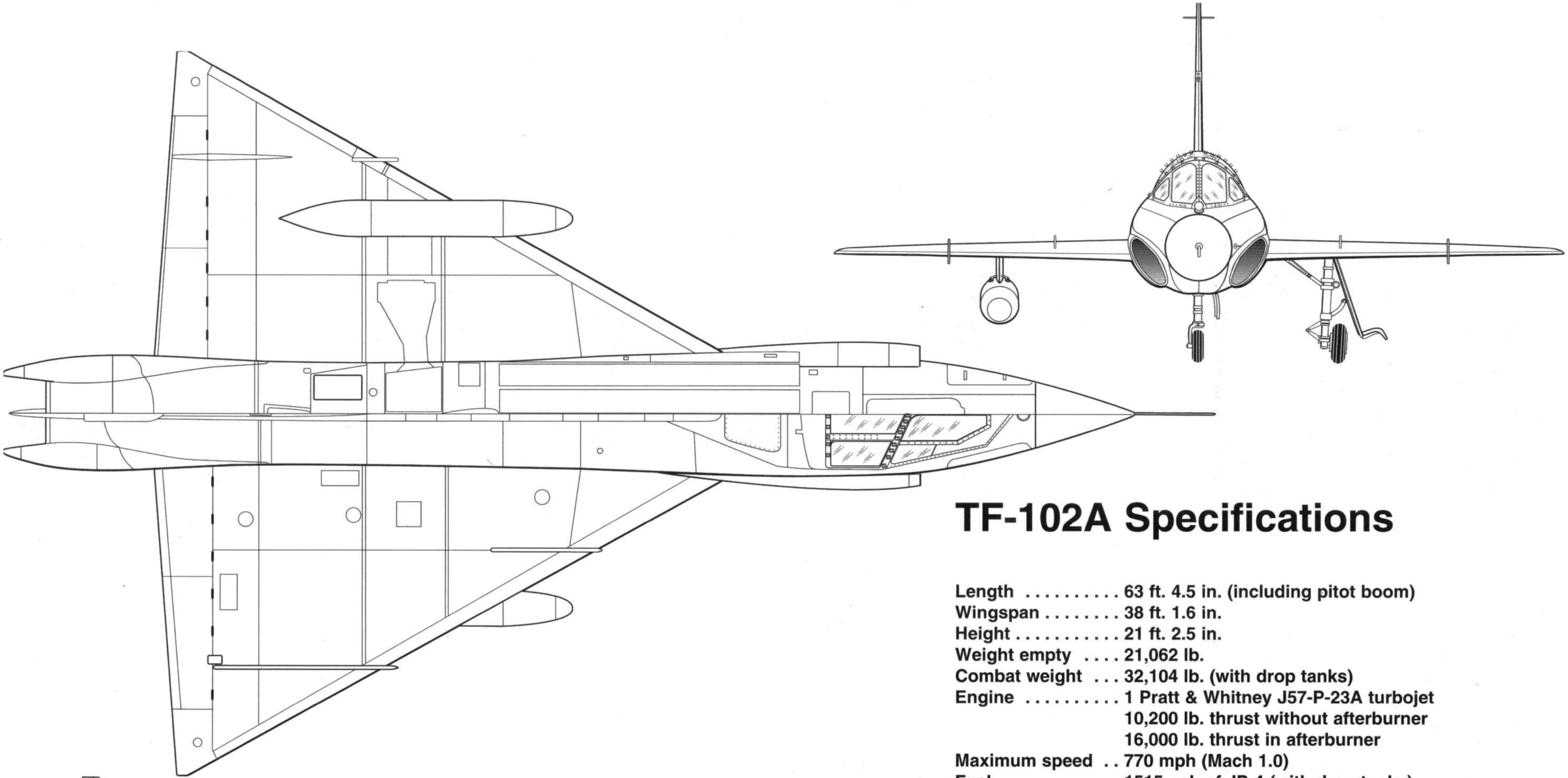
Convair Test Pilot Dick Johnson pops the chute on the first TF-102A at Edwards AFB following its initial flight on 8 November 1955. The first TF-102A used the short tail fin and smaller dive brakes seen on the early F-102A fighters. TF-102As were used for pilot training of both F-102A and B-58 Hustler bomber crews, as it was the only delta-winged trainer available. (USAF)

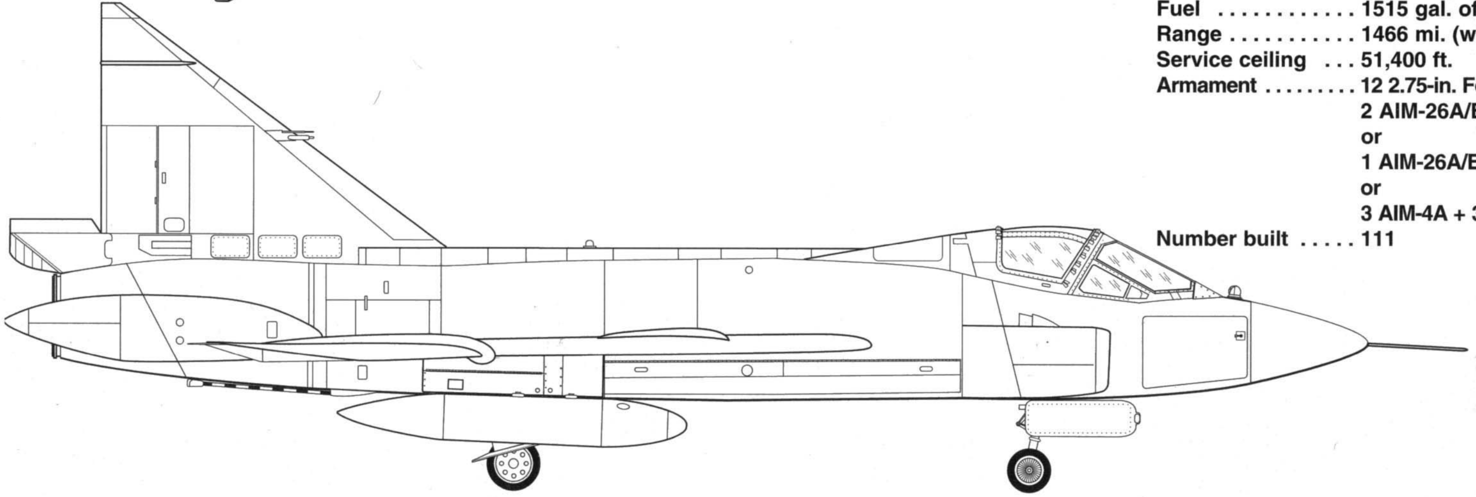


(Left) Cockpit of the TF-102A featured dual controls and fire control systems. The gun sight and MG-3 FCS radar scopes can be seen at the top of the instrument panel coaming. Cockpit interior was flat Light Grey (FS 36473) with Black control panels. (USAFM)

(Below) A TF-102A-45 shows the production engine intake design and canopy with vortex generators added at the front and rear of the canopy to alleviate fuselage buffet. Production aircraft had both the modified canopy and the taller tail, which eliminated the buffet. (USAF)

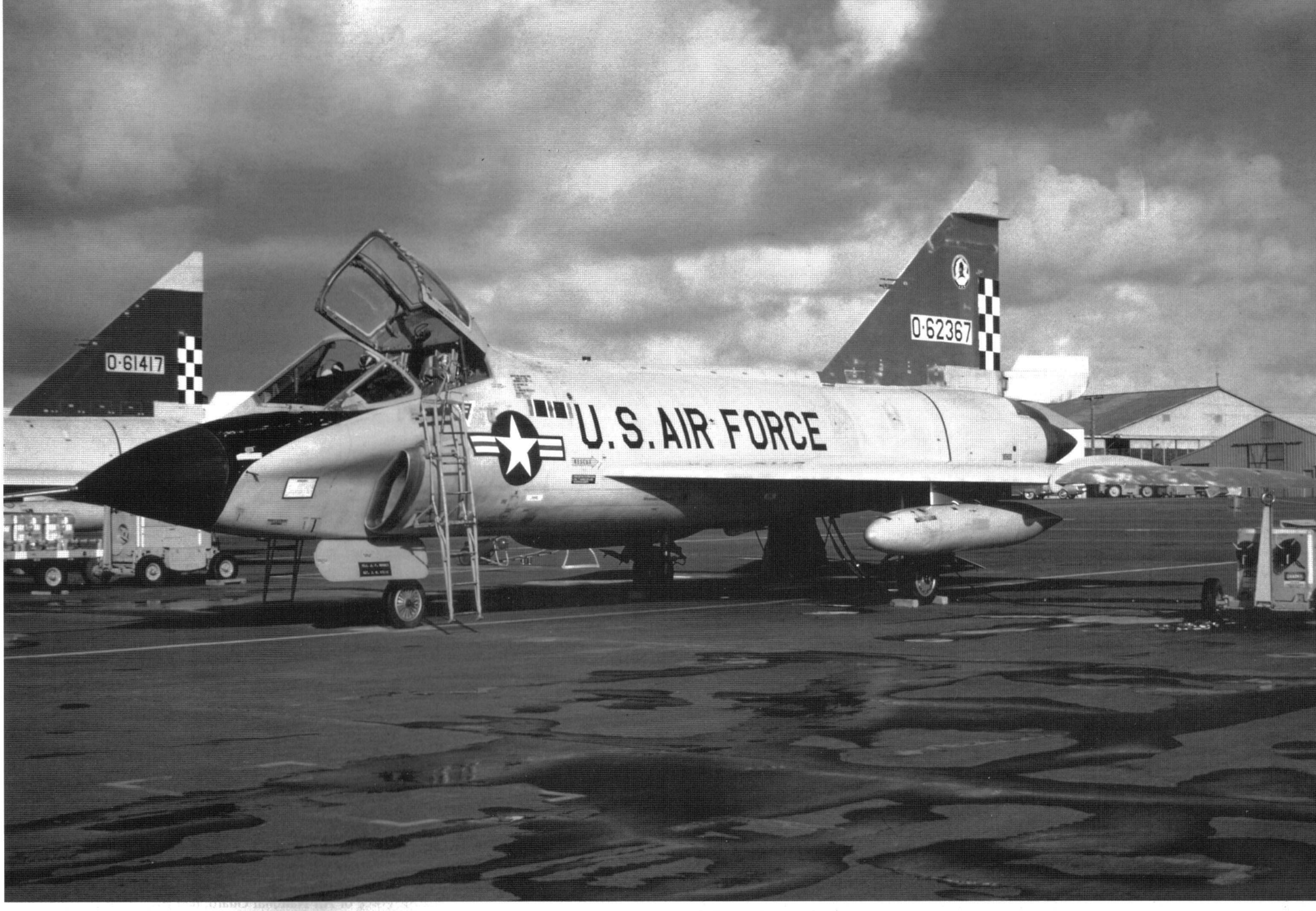




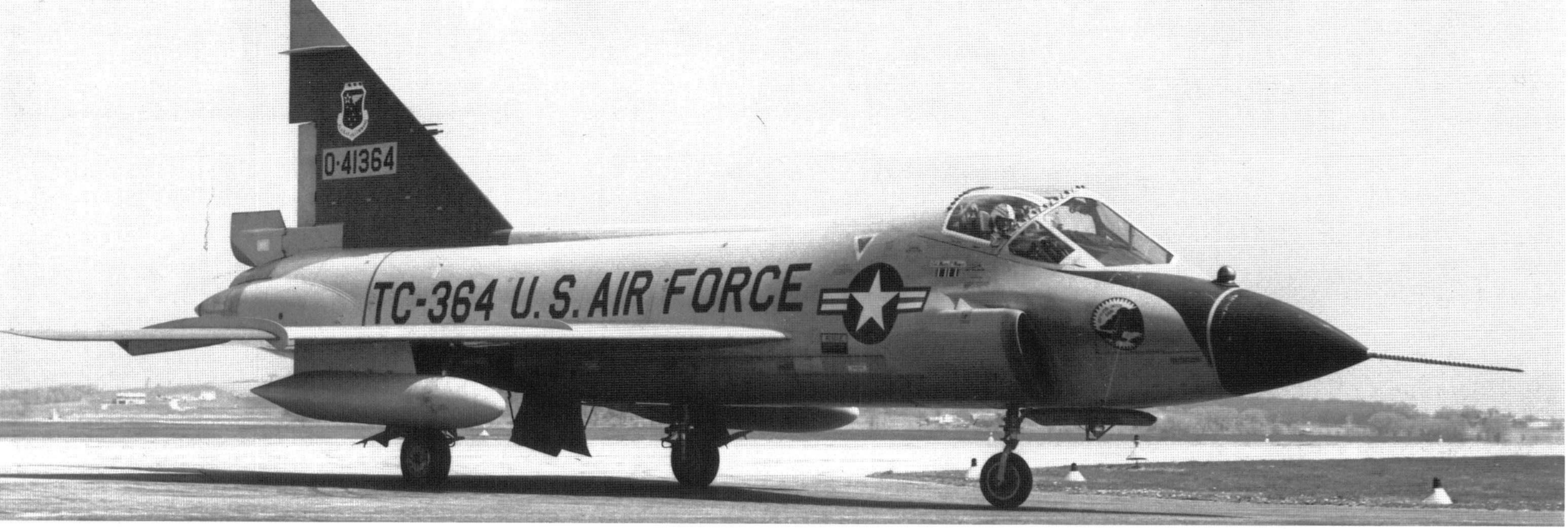


TF-102A Specifications

Length	63 ft. 4.5 in. (including pitot boom)
Wingspan	38 ft. 1.6 in.
Height	21 ft. 2.5 in.
Weight empty	21,062 lb.
Combat weight	32,104 lb. (with drop tanks)
Engine	1 Pratt & Whitney J57-P-23A turbojet 10,200 lb. thrust without afterburner 16,000 lb. thrust in afterburner
Maximum speed	770 mph (Mach 1.0)
Fuel	1515 gal. of JP-4 (with drop tanks)
Range	1466 mi. (with drop tanks)
Service ceiling	51,400 ft.
Armament	12 2.75-in. Folding Fin Aircraft Rockets and 2 AIM-26A/B Super Falcon (conventional/nuclear) or 1 AIM-26A/B + 2 AIM-4A radar-guided Falcon missiles or 3 AIM-4A + 3 AIM-4C/D/G infra-red Falcon missiles
Number built	111

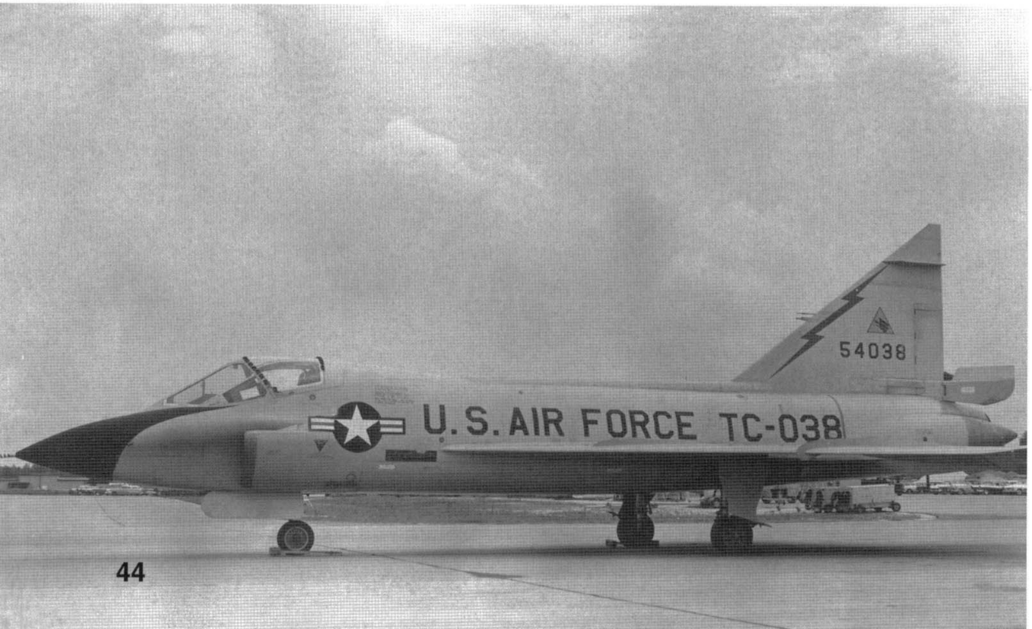


A TF-102A-45 from the 57th FIS on the ramp at Keflavik, Iceland, in September 1969. The ribbon above the national insignia is the Air Force Outstanding Unit Award. Operational squadrons equipped with the F-102A had two TF-102As included in their assets. The TF-102A had the same combat capabilities as the F-102A but used the MG-3 FCS. (Stephen Miller)



A TF-102A-15 from the 317th FIS taxies back to its parking spot at Elmendorf AFB, Alaska, in 1967. The buzz code "TC" indicates a trainer aircraft, even though the TF-102A was flown on regular operations alongside the fighter aircraft which were coded "FC." The infra-red search and track (IRST) seeker is directly in front of the windscreen. (Joe Bruch)

This TF-102A-30 from the 482nd FIS at Seymour Johnson AFB, North Carolina, seen in 1960, has a red lightning bolt on the tail as its unit marking. Markings on ADC F-102s could be quite colorful, but most were rather mundane. The 482nd FIS sent a detachment to Homestead AFB, Florida, in response to possible Cuban aggression following the failed Bay of Pigs invasion in 1961. (USAF)

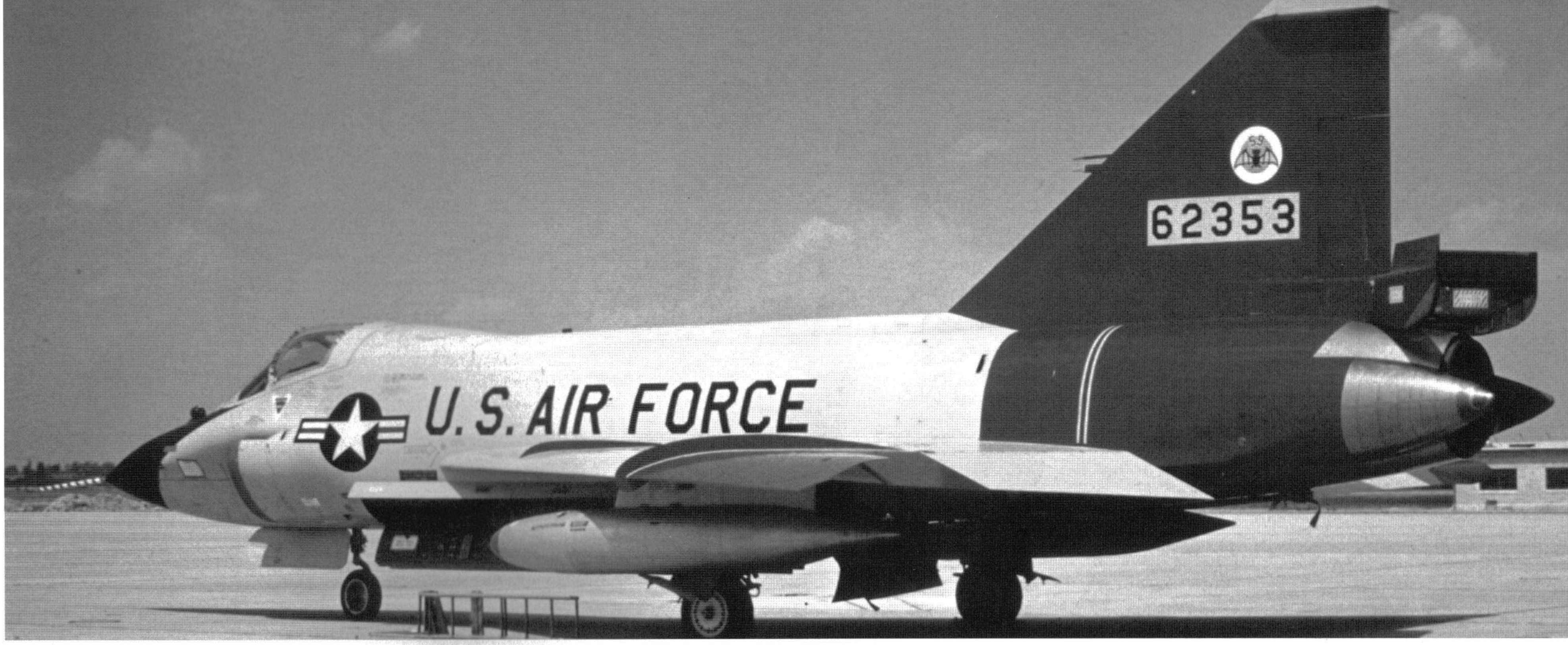


directional stability problems.

But one problem that was immediately noticeable and would not go away was a substantial buffet, especially at Mach 0.9 and beyond, caused by the design of the canopy. The taller vertical tail alleviated some of the problem but not all of it. Initially, Convair engineers redesigned the canopy, making it slightly lower in height and with a revised canopy windscreen, but the buffeting continued, and the lower canopy height reduced landing and taxi visibility. The Air Force and Convair made the decision to revert to the original canopy design and fix the buffet. Convair engineers found that by fixing small sheet metal tabs known as 'vortex generators' at various spots around the canopy, the buffeting was alleviated.

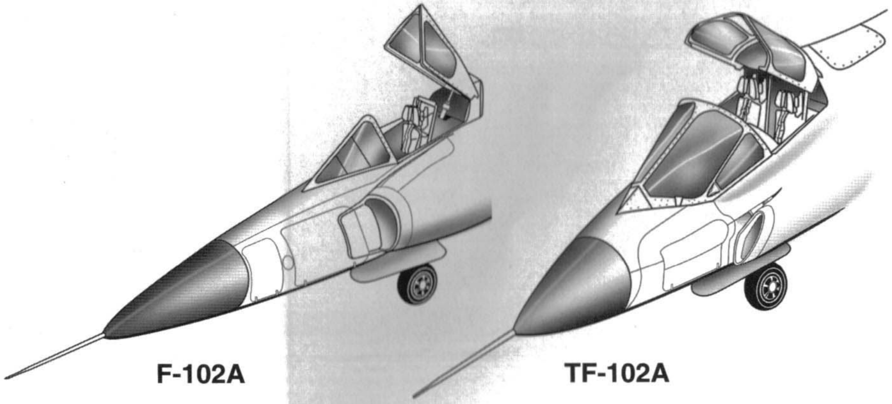
After much experimentation, the combination of the taller vertical tail and installation of the vortex generators was found to have eliminated the buffet. The third prototype TF-102A, serial 54-1353, was rolled out in June 1956 with all the improvements included, and flight tests confirmed that the buffet was gone. By late November 1956 the Air Force was satisfied and gave Convair an order for 169 TF-102As. However, due to the problems that caused many halts in production, plus introduction of the F-106 "Ultimate Interceptor," the Air Force reduced the number of production TF-102As to 111 aircraft. The final TF-102A came off the assembly line in July 1958.

The first batch of TF-102As was assigned to Perrin AFB, Texas, where the 4780th Air Defense Wing was charged with pilot training and transition into the F-102A. Eventually, the entire 4780th ADW was equipped with TF-102As. In addition, all units that operated the F-102A Delta Dagger, whether Air Force or Air National Guard, had two TF-102As, both with full combat capabilities, assigned as part of their assets. As the F-102A was phased into Air Guard service beginning in 1960, the TF-102As were also phased into the Air Guard.

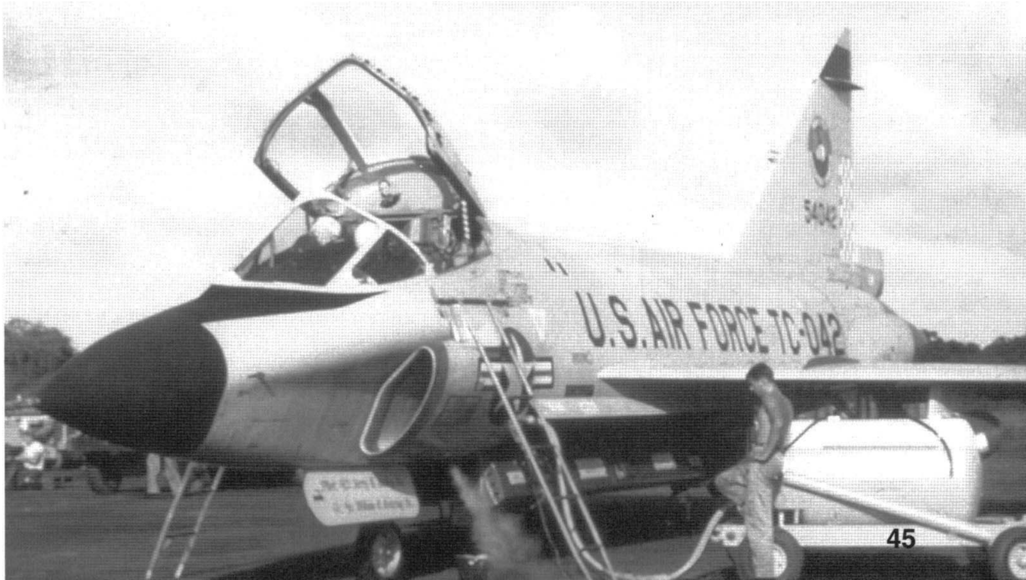


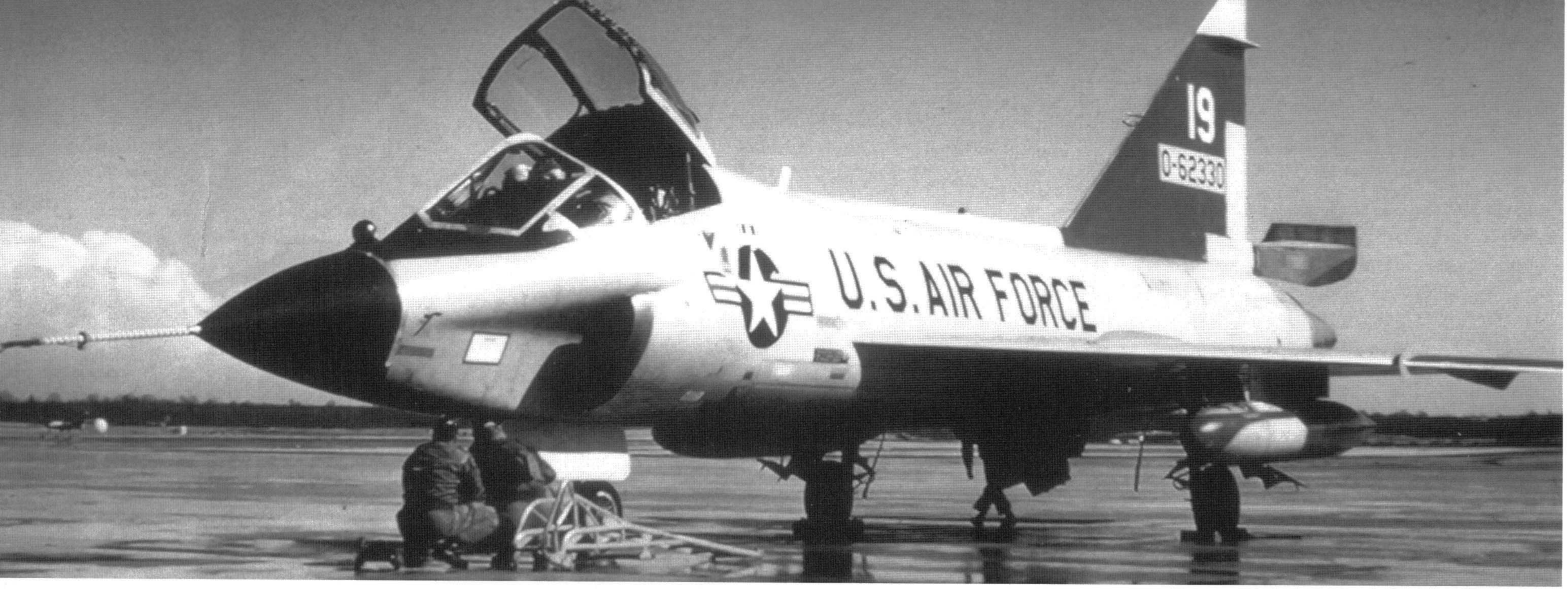
(Above) A 59th FIS TF-102A-41 on the ramp at Andrews AFB during a visit in June 1965. As with the F-102A, the TF-102A had the "Case XX" wing with cambered wingtips added. The 59th FIS was based at Goose Bay, Labrador, and flew the F/TF-102A from May 1960 to December 1966. (Richard Sullivan)

F-102A to TF-102A Nose Development



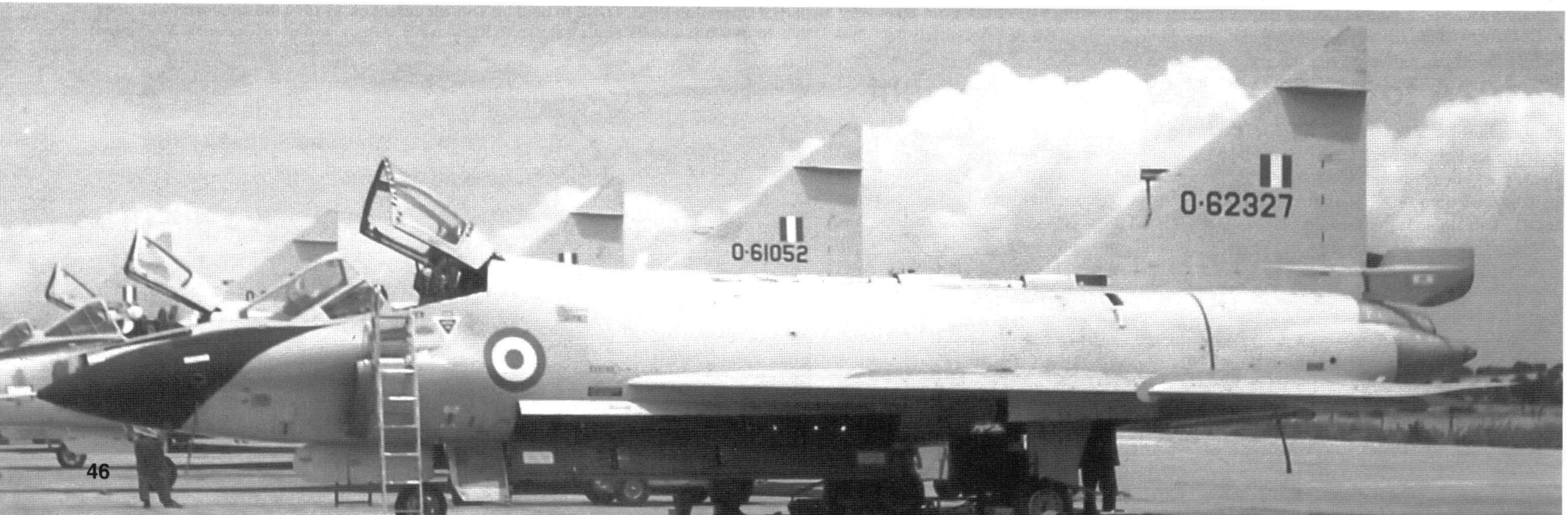
(Below) A TF-102A from the 509th FIS gets liquid oxygen on the ramp at Don Muang Airport, Bangkok, Thailand. The 509th FIS sent a flight of F-102s to Don Muang in 1962 as part of Operation BELL TONE to beef up Thai air defenses. In 1970 the squadron was deactivated at Clark and its aircraft flown to Itazuke AB, Japan, and scrapped. (Bill McDonald)

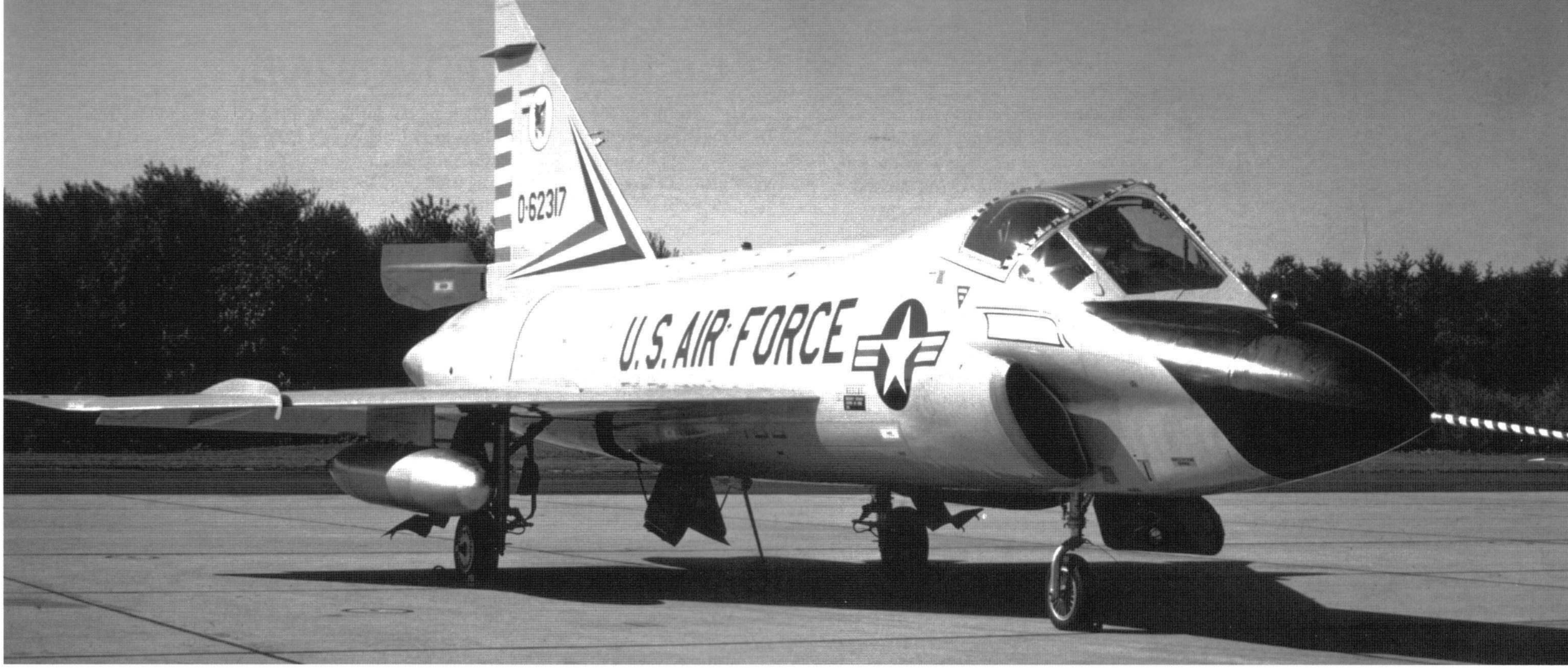




A TF-102A from the 176th FIS, Wisconsin Air National Guard on the ramp at Truax Field, Madison, Wisconsin, in April 1970. In May 1966 the 176th FIS converted from Northrop F-89Js to F/TF-102As, operating the type until fall 1974 when the squadron was reassigned to a Tactical Air Command mission with Cessna O-2As. (Robert F. Dorr)

A TF-102A-40 from the 342nd Squadron of the Greek Air Force, based at Tanagra, Greece. The Greek Air Force began operating F/TF-102As in 1969 when they received the first of twenty F-102As. Greek F/TF-102s did not receive many of the updates found on USAF aircraft, including the IRST infra-red seeker, but they were equipped with the MG-10 FCS. (Peter Peltz via Ron Picciani)





A TF-102A-35 from the Air Defense Weapons Center at Tyndall AFB, Florida in 1968. The ADWC was charged with developing weapons systems, improvements, and tactics for all aircraft types with an air defense mission. The vortex generators that eliminated the fuselage buffet resulting from the wide-body fuselage and canopy can be seen in two rows on the leading and trailing edges of the canopy glazing. (Frank MacSorley via Stephen Miller)

Members of the 64th FIS gather on the ramp at Udorn, next to one of the squadron's TF-102As, prior to departing for Clark AB, Philippines, as Operation CANDY MACHINE draws to a close. Late in 1969, the 64th FIS was deactivated at Clark and the squadron's F/TF-102A assets were distributed to Air National Guard units in the United States. (Robert F. Dorr)

Other Variants

F-102B (Model 8-21)

The F-102B was proposed as an advanced version of the F-102A to be equipped with the Hughes MX1179 (production designation MA-1) Fire Control System and powered by the Wright J67 turbojet engine. But developmental problems with the J67 led the Air Force to change the powerplant of the F-102B to the Pratt & Whitney J75 engine. Weapons would have included a single Douglas MB-1 Genie nuclear-tipped missile in addition to four Hughes GAR-1 Falcon air to air missiles, all housed in an internal bay.

In November 1955, the Air Force awarded Convair a contract to build 17 F-102B aircraft, then known as the "Ultimate Interceptor." The mockup of the F-102B, along with the Hughes MX-1179 FCS and cockpit displays, was inspected and approved in December 1955. However, there were so many differences between the F-102A and the F-102B that the Air Force changed the designation of the latter to F-106 on 17 June 1956.

(▸▸ 48)

F-102C

The F-102C (originally F-102X) was a Convair-proposed interceptor, to be powered by a Pratt & Whitney J57-P-47 engine with a titanium compressor and carrying an MB-1 Genie nuclear-tipped missile and four Falcons, intended as a 'gap filler' between the end of the service life of the F-102A and the introduction of the F-106. Two F-102As (serials 53-1797 and 53-1806) were modified as YF-102C engineering test aircraft, but the concept was rejected by the Air Force in 1957.

JF-102A

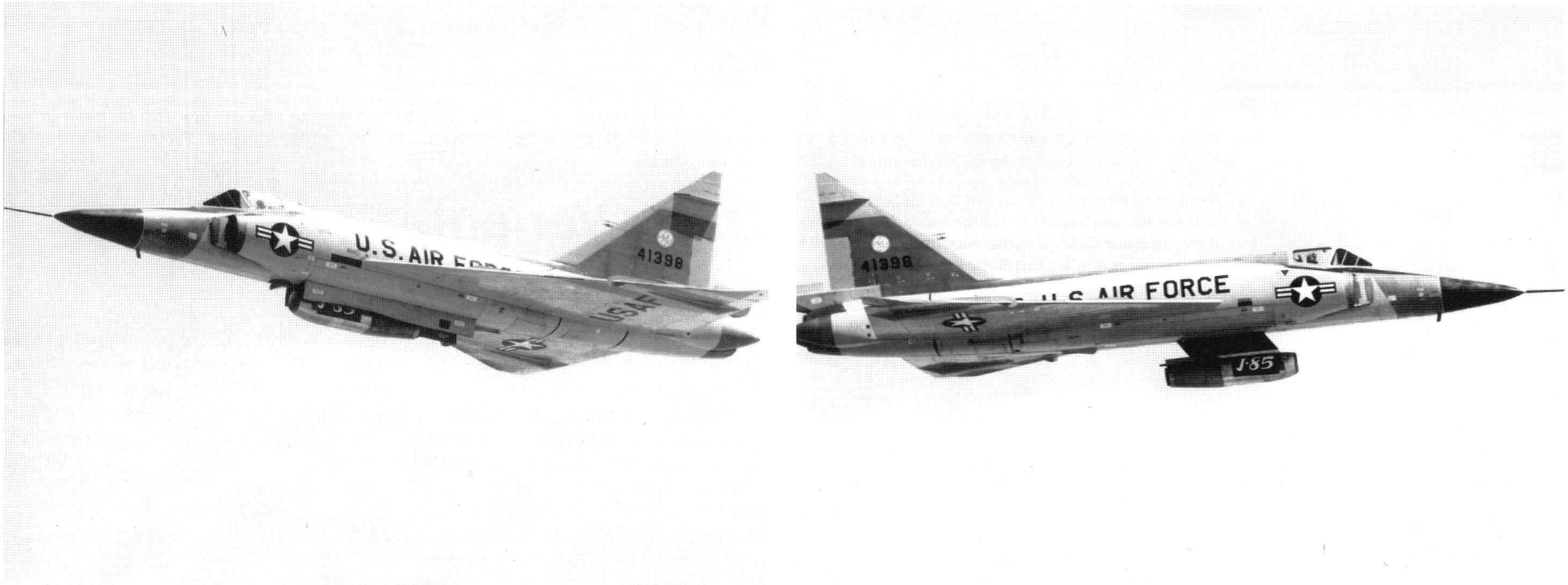
Any F-102A/B diverted for a special project or test could be temporarily redesignated JF-102A/B. This included aircraft used to test the Douglas MB-1 Genie missile and the advanced MA-1 FCS that would be part of the F-106 "Ultimate Interceptor" package. One aircraft had the weapons bay modified to internally carry the J85 jet engine that would eventually power the T-38, F-5, and the AQM-20 Quail decoy missile. Another JF-102A was operated by NASA's Dryden Flight Research Station, where it was flown by test pilots Jack McKay and Neil Armstrong in a series of landing approach tests in preparation for the ill-fated X-20 (Dyna-Soar) program.

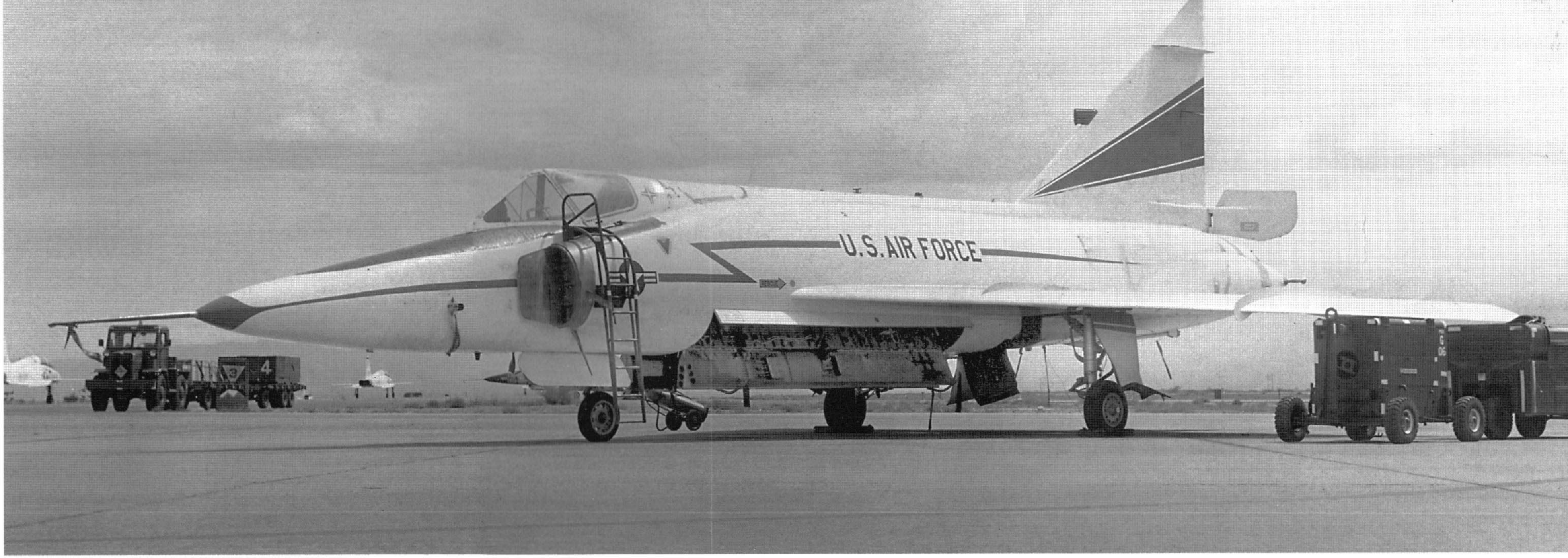
QF-102A and PQM-102A/B

The need for a high-speed drone aircraft for use as a test target led to the "Deuce's" final role. Under Project PAVE DEUCE, in 1973 the Sperry-Rand Corporation converted six retired F-102As to remotely piloted drone aircraft for use as targets in support of the F-15 test program. Two of these aircraft, designated QF-102A, retained conventional controls and could be flown by human pilots; the remaining four were converted to PQM-102As. The ejection seats and all offensive and defensive armament and electronics of these aircraft were removed and a Sperry-Rand Flight Control Stabilization System, a low-altitude radar, a smoke system for ground tracking, and a destruct system were installed. Sperry subsequently completed at least another 65 PQM-102A conversions. Beginning in 1978, Sperry converted a further 66 F-102As to PQM-102Bs, and Goodyear was awarded a contract for an additional 80. The PQM-102B had all its remote-control equipment installed in the nose, allowing it to be flown manually by a pilot using conventional controls.

Many Deuce drones were assigned to Holloman AFB, New Mexico, where they were routinely targeted in U.S. Army surface-to-air missile tests. Others were sent to Tyndall AFB, Florida, home of the Air Force's "William Tell" interceptor competition, where they were flown as targets to be shot down by Air Force F-106s and F-4s. The last PQM-102B was expended at Holloman AFB in 1986.

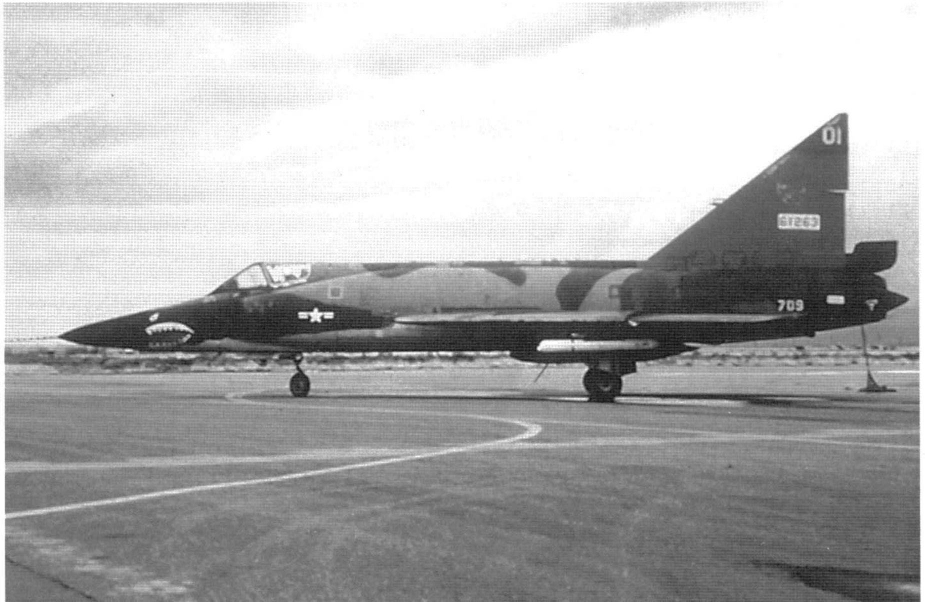
(Below and Below Right) A JF-102A-35 with a General Electric J85 engine installed within the fuselage weapons bay for flight tests in 1959. The F-102A was "bailed" (loaned) to General Electric to conduct the tests. Operational aircraft used in various test programs, and modified for those tests in some way, were prefixed with the letter J, thus JF-102A. (AFFTC)



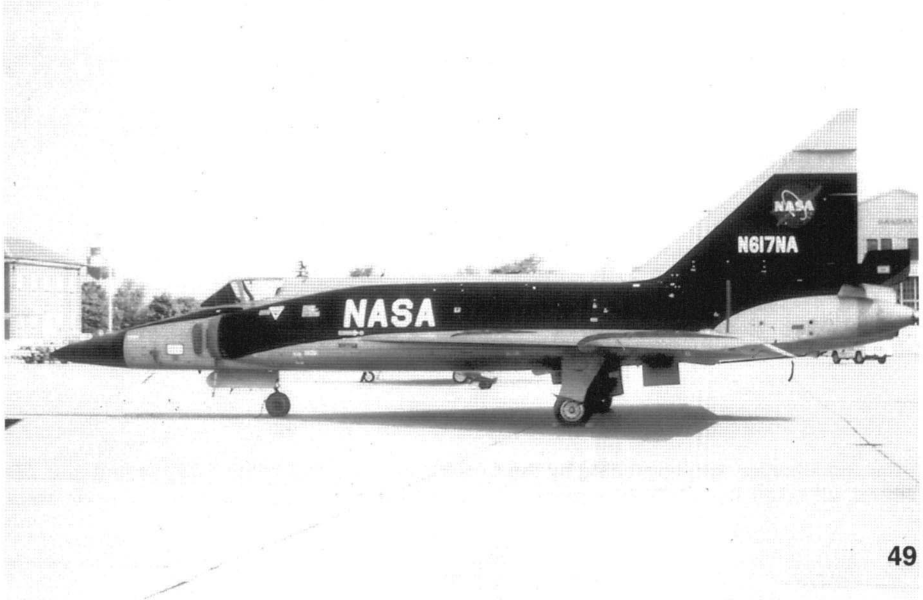


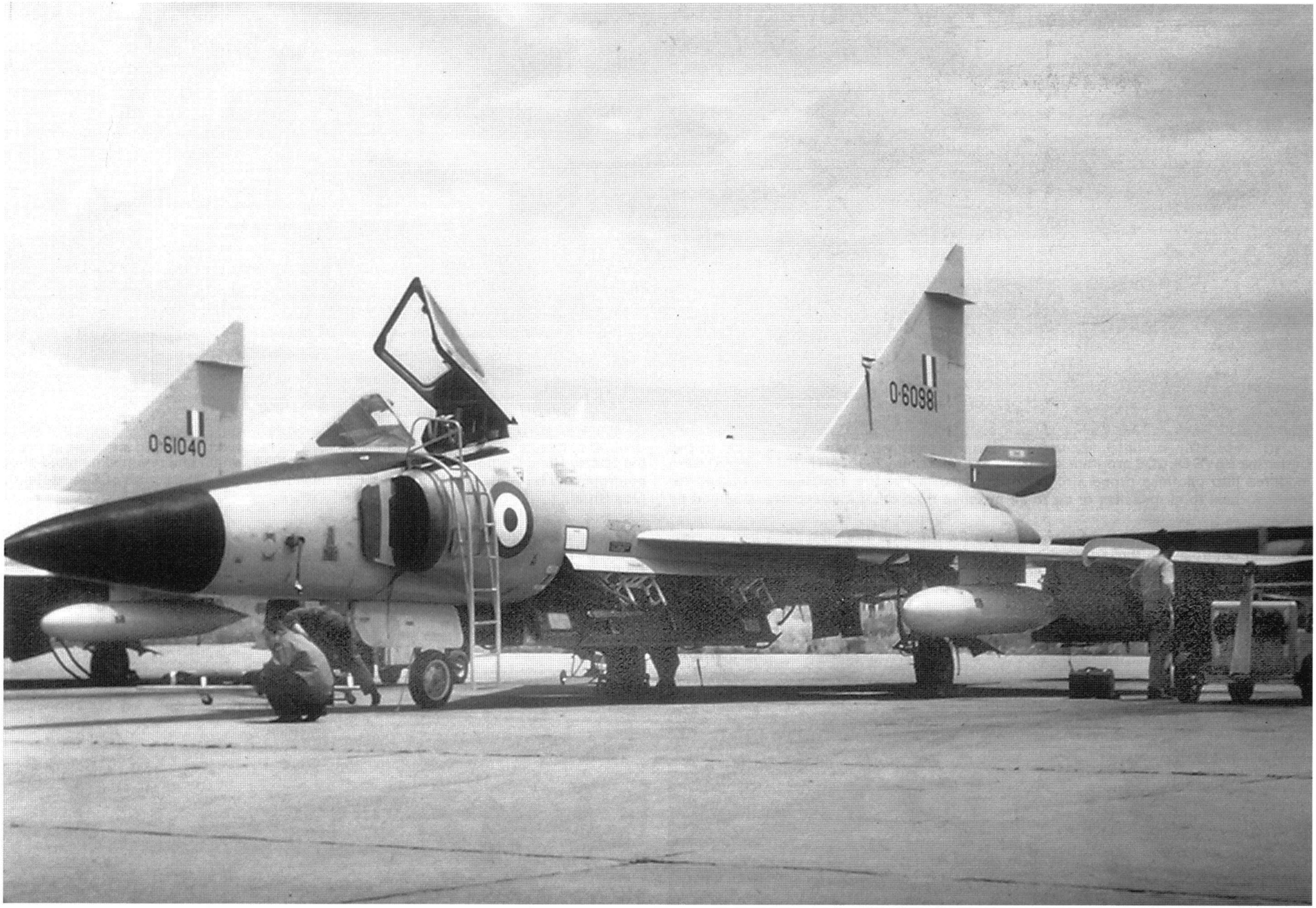
Under the PAVE DEUCE program in 1978, the first of many F-102A/TF-102A aircraft were modified into pilotless drone aircraft, to be used in live-fire exercises as targets for either surface to air missiles or air to air missiles from other interceptors. Modified by the Sperry-Rand Corporation, this is the first QF-102A, which still retained manned pilot controls, and is painted all-White with Red flash markings — the colors of Sperry-Rand. (Joe Bruch)

Sperry Rand converted at least 69 F-102As to PQM-102As. The PQM-102A had no conventional controls like those found in the QF-102A. This PQM-102A (56-1263) had Red wingtips and tail for visibility. (John Dienst)

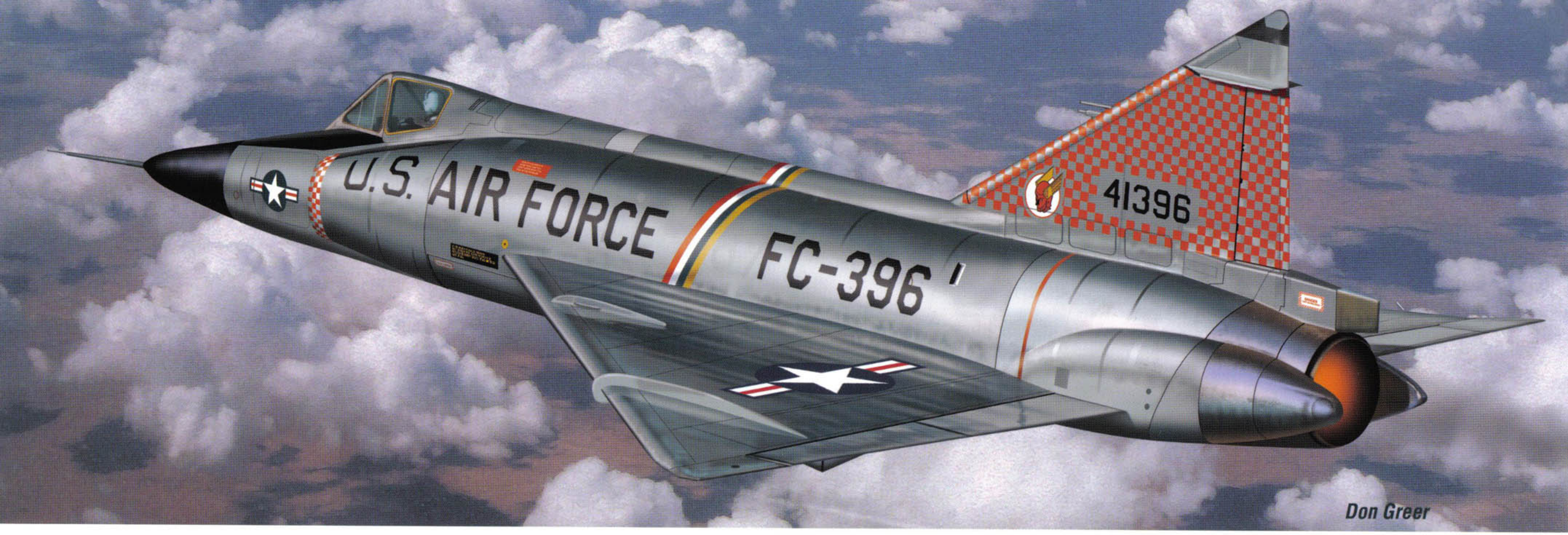


The National Aeronautics and Space Administration flew at least nine F-102As during the 1960s. N617NA (F-102A-55, USAF serial 56-998) was based at the Lewis Research Center at Hopkins Airport, Cleveland, Ohio, and was used for F-106 ejection seat tests. (Ron Picciani)





After modification and upgrading by the CASA firm in Spain, twenty F-102As and four TF-102As, all taken from USAFE squadrons that had transitioned into newer aircraft, were delivered to the Greek Air Force. This F-102A-55 was assigned to the 114th Wing at Tanagra, Greece, in 1972. (David Menard)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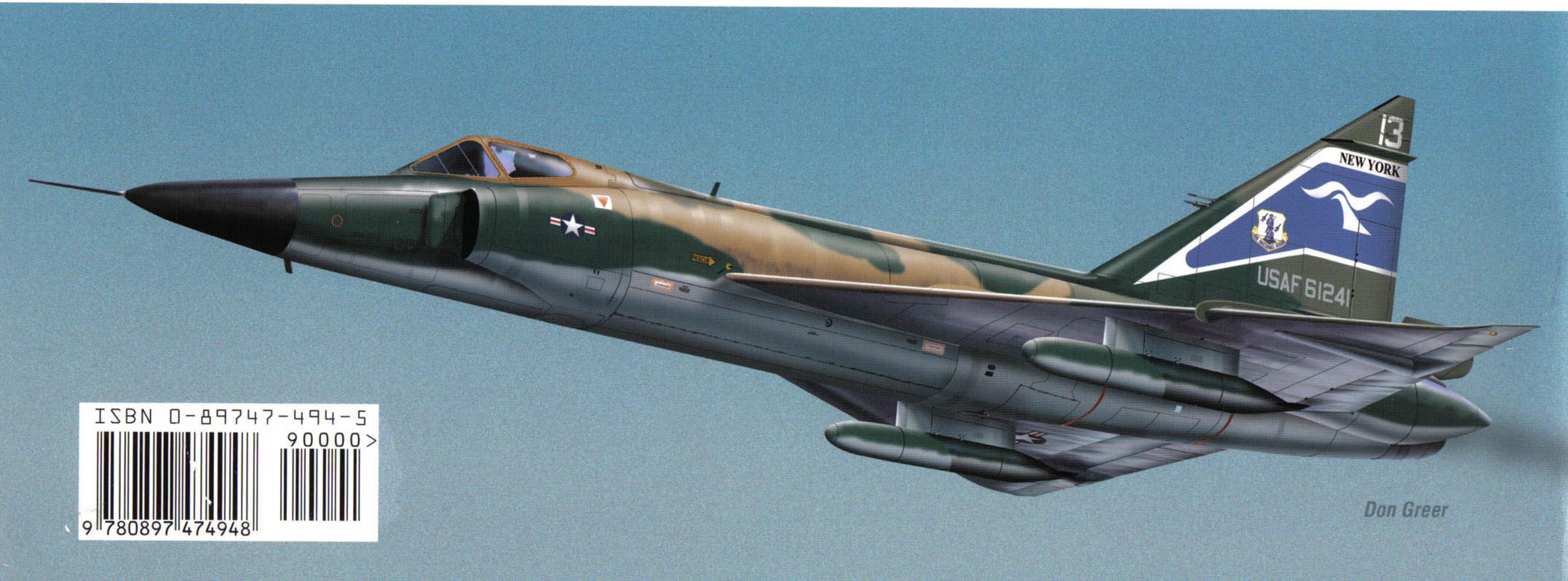
(Above) Col. Charles Rigney flew this 327th FIS F-102A-30 from George AFB, California, to Oklahoma City at an average speed of 819 mph in September 1956.

(Below) An F-102A from the 102nd FIS, New York Air National Guard, based at Suffolk County, New York, in 1976.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